THE IRON TRADE REVIEW

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COAL SUPPLIES

OF LARGE SIZE HELD BY MANY MANUFACTURERS.

And Strike is Not Causing Much Apprehension.—Some Improvements in Demand for Pig Iron.—Coke Firm.

Reports indicate that nearly all manufacturers are well supplied with coal, and the miners' strike will probably not cause much inconvenience unless long continued. There are, however, some exceptions, among which are a number of bar iron mills which will not be able to continue operations more than a few weeks.

Inquiry for Pig Iron. The pig iron market is a little more lively. Inquiry for 12,000 tons from Westinghouse interests is pending, and is likely to develop strong competition. The leading southern producer has receded from its position of demanding $14.50 Birmingham for No. 2, and is now soliciting orders at $14.00. While $13.75 is the ordinary price, occasionally, $13.50 has been named on desirable business. On northern irons, competition has resulted in some lower prices being made, but $17.00, valley, is the usual quotation for No. 2 foundry. The quotation in southern Ohio is slightly lower. The principal recent sale of pig iron was 10,000 tons of basic taken by the Inland Steel Co., of Chicago. Inquiries from malleable interests in the Chicago district have been withdrawn on account of prices not being satisfactory.

Bar Prices Reaffirmed. Steel bar manufacturers have reaffirmed prices, and very little business is appearing. Implement manufacturers are inclined to await developments, as most of their contracts for the year ending July 1, are $4.00 per ton below present quotations. A reduction of $1 per ton has been made to buyers of bar iron taking 100 tons or more.

Rail Market Is Active. The rail market continues active, and the principal producer cannot guarantee delivery earlier than the last quarter of the year. During the past week, about 30,000 tons have been sold, including 10,000 tons to the Pere Marquette. Trolley lines have been heavy buyers. The price of light sections, 25 to 45 pounds, has been advanced $1.00 per ton. Spikes have been advanced $1.00. There is a very strong demand for all kinds of track material.

Sheet Bars Are Scarce. Independent interests complain of the recent advance to $28.00 in the price of sheet bars, but that quotation is being firmly adhered to. The scarcity of sheet bars has prevented many mills from operating to their full capacity. While new business is light in the west, in other centers the buyers of sheets are placing orders freely, and mills are unable to give deliveries in less than eight to ten weeks, which is considered slow for this kind of finished material. Business in plates is not so active, and somewhat earlier deliveries are being given. The demand for delivery of wire products is insistent, and even stronger demand is expected from the farmers as soon as the weather becomes more favorable.

Railroads Are Buying. The new business of the American Bridge Co., for March has been slightly in excess of 60,000 tons. Railroads are buying extensively for track elevation and bridges, the demand for elimination of grade crossings in many cities being shown in the orders. Active preparations are being made throughout the country for building operations, and it is expected that the showing for the year will make a new record.

The price of wire rods has been advanced $1.00 per ton.

Coke and the Strike. The coke market is firm, with quotations on foundry and furnace grades very nearly equal. The prospect of a complete tie up in the anthracite mines has had considerable effect on coke. The demand for old material shows a little improvement, although in some places the opinion prevails that quotations will not be lower.

COTTON TIE MARKET OPENS.

(Special Telegram.)

Pittsburg, April 4.—The cotton tie market opens for the season Thursday, April 5, and it is announced that the price of the leading interest is to be 85 cents, the same as last year. This announcement has been anxiously awaited for several weeks, and tremedous business is expected to develop at once.

POPE DEAL FALLS THROUGH.

The deal involving the purchase by the La Belle Iron Works of the Pope Tin Plate Co., with works at Steubenville, O., upon which it held an option, has fallen through and the concern will remain in its present hands. On March 6, the directors of the La Belle Iron Works voted to accept or exercise the options it held on the majority stock of the Pope Tin Plate Co. These options did not expire until April 2, and on March 27 the directors of the La Belle company decided not to exercise its options and so notified Charles E. Pope, president of the tin plate company.

Bethlehem Steel Corporation.—The annual meeting of the Bethlehem Steel Corporation was held at Newark, N. J., April 3. The stockholders ratified the proposed bond issue of $12,000,000 which is to be underwritten by Harvey Finke & Sons. George R. Sheldon, Archibald Johnstone and Oliver Wren were elected directors to serve for three years. A synopsis of the financial statement was read by President Charles M. Schwab. It showed gross earnings for the past fiscal year of $3,313,929. The net income was $2,365,399. Dividends on preferred stock paid during the year reduced the surplus to $1,843,619.

Blast Furnace Record.—The four blast furnaces of the Carnegie Steel Co., at Duquesne, Pa., during March produced 78,128 tons of pig iron, breaking the previous world's record held by the Edgar Thomson works of 77,142 tons. The furnaces were built with an estimated capacity of 500 tons each per day.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Diminished Demand for Finished Material.—Strike Effects not Feared.

OFFICE OF *The Iron Trade Review*,
521 PARK BUILDING, April 3.

The action of the mine workers at the Indianapolis convention in agreeing to permit the operation of the properties of operators who are willing to sign the mining scale of 1903, and the consequent signing of that scale by interests in Pittsburg representing an annual output of 21,000,000 tons of bituminous coal have had the effect of relieving an immense tension during the past week and although interests representing 20,000,000 tons output have up to this time refused to sign the scale, the effect of a strike in the mines of these operators will not be seriously felt in this district; in fact, as far as obtaining fuel for requirements is concerned all cause for apprehension is past.

There has been but little change in market conditions during the week under review. While one or two interests have assumed a bearish attitude and are making predictions of a like nature, the majority of interests are decidedly optimistic. Based on existing obligations and output, many interests are now oversold in finished lines well along toward the first of next year and as far as pig iron is concerned many furnaces are sold up through the third quarter and are open for business extending through the third quarter and last half of the present year. A report that one furnace interest has sold the entire output of its plant for the year has been in general circulation, but this cannot be verified at this time.

The new business in finished lines has not been in comparison with that of several months past, but mills are working to the utmost to make deliveries on old contracts. The dropping off in new business has been experienced in nearly all the finished lines, but no apprehension is felt on this account, as so many of the mills are not in position to accept new obligations and promise delivery short of several months. Prices have remained practically unchanged, the only change being an advance of $1 per ton on light rails, 25 to 45 pound sections by the leading interest. Independent sheet and tin plate manufacturers have complained bitterly against the advance to $28 on sheet bars, but as far as can be learned this has not been shaded. At a meeting of steel bar manufacturers held in this city last week no definite action was taken aside from a general understanding being arrived at to maintain present prices to implement makers on contracts for the year beginning July 1.

The purchase of the Pope Tin Plate Co., at Steubenville, O., by the La Belle Iron Works, reported from some sources as having been consummated, is not a fact. The options held by the La Belle Iron Works on the Pope plant expired April 2 and were not exercised, despite the vote of the La Belle directors on March 6 to exercise them. At a subsequent meeting, March 26, the former action was rescinded and the Pope plant will remain under its present management.

Pig Iron.—The only feature in the pig iron market during the week has been the negotiation by the Westinghouse Electric & Manufacturing Co., for the purchase of 12,000 tons of foundry iron, of which less than 1,000 tons will be southern to comply with specifications. It was thought the United States Steel Corporation would buy Bessemer this week, but as yet (Tuesday) nothing has been closed. The Mildland Steel Co., announces it will be a producer of pig iron beginning July 1, and is now ready to take on business for second half delivery.

No. 2 northern foundry iron is generally quoted $17 to $17.25, valley furnace and southern at $14 Birmingham, but on a desirable deal this could probably be shaded. Bessemer is quoted $17.50 to $17.75 but it is thought the corporation deal will bring $17.25, the same as its other second quarter Bessemer was bought at. Gray forge, northern, is held at $16 valley furnace and basic about the same as northern foundry. There has been a better inquiry for foundry iron although no extensive buying is expected for another 30 days. We quote:

Bessemer Valley	$17.50
Bessemer, Pittsburg	18.35
No. 1 Foundry, Pittsburg	18.50 to 19.00
No. 2 Foundry, Pittsburg	17.85 to 18.10
Gray Forge, Pittsburg	16.85 to 17.10
Basic, Valley	17.00 to 17.25
Basic, Pittsburg	17.85 to 18.10

Ferro-Manganese.—For spot delivery ferro-manganese, foreign, 80 per cent, is quoted $135 to $145 and for delivery this side of June about $110. For last half delivery quotations from $85 to $90 have been made, but mostly as a speculation.

Billets.—While the official price of Bessemer billets is quoted at $27, Pittsburg, they are exceedingly hard to obtain at that and to buyers not protected by contract and obliged to buy in the open market the price would be about $27.50 and on open-hearth $1 higher.

Skelp.—There has been some movement in skelp during the week and makers report what appears to be a beginning of the spring business. We quote:

Bessemer grooved, 1.65c to 1.70c; sheared, 1.70c to 1.75c; basic, grooved, 1.65c to 1.70c; sheared, 1.70c to 1.75c; iron skelp, grooved, 1.65c to 1.70c; sheared, 1.80c to 1.85c.

Muck Bar.—Transactions amounting to between 2,000 and 3,000 tons are reported and we quote $27.50 to $28 on scrap bar and $29 on all pig metal muck bar.

Rails and Track Material.—While the big tonnage of last week has not been equaled, considerable new business in standard sections has been booked and local interests have taken 5,700 tons for the Denver, Kansas City & Gulf and 8,000 tons for the Tonapah road and other smaller orders aggregating in all about 27,000 tons. The same interest announced an advance in light sections, 25 to 45 pounds, of $1 per ton or to $29. We quote:

Fifty pounds and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 16 pounds, $30; 20 pounds, $28.50 to $29; 25 to 45 pounds, $29; angle bars for standard sections, 1.50c; spikes, $2.05 to $2.10.

Structural Material.—The new structural mill of the Jones & Laughlin Steel Co. was tested for the first time today (Tuesday) when material was run through the entire mill. The test was highly satisfactory. This company during the week secured the contract for 6,500 tons of structural material for the Syndicate Annex building, at St. Louis. There is an immense amount of structural business in sight. We quote:

Beams and channels, 15 in., and under, 1.70c; over 15 in., 1.80c; zees, 1.70c; tees, 1.75c; angles from 3 to 6 inches, inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Hoops and Bands.—Mills are busy on old contracts, but comparatively little new business has been placed. We quote:

Hoops, 1.90c in carload lots, and 2c on less than carload lots, bands, 1.50c base, half extras as per standard steel card. Prices f. o. b. Pittsburg.

Merchant Pipe.—Prices continue low and the extreme discount on merchant sizes remains at 81 per cent to the large trade. Considerable pipe line business

is being talked of, but it is too far in the future to make any definite statements at this time. The new business is running light and mills are busy on old contracts. We quote pipe, consumers' carloads, with jobbers' carloads one point higher discount:

	Steel		Iron	
Consumer's Carloads	Black	Galv.	Black	Galv.
⅛ and ¼ inch	71	55	67½	51½
⅜ inch	73	59	69½	55½
½ inch	75	63	71½	59½
¾ to 6 inches	79	69	76	66
7 to 12 inches	74	59	71	55½
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	64	52	60½	48½
¼ to 4 inches	71	59	67½	55½
4½ to 8 inches	67	55	63½	51½
Double extra strong plain ends, ⅛ to 8 inches	60	49	56½	45½

Boiler Tubes.—There is a very heavy demand for locomotive boiler tubes and mills are behind on deliveries. Aside from this, but little business has been done. On merchant boiler tubes, 22 feet and under, consumers' carloads, we quote as follows:

	Steel	Iron
1 to 1¼ inches	46	41
1¾ to 2¼ inches	58	41
2½ inches	60	46
2¾ to 3 inches	66	53
6 to 13 inches	58	41

Less than carload lots two points less.
2½ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 per cent net extra.

Wire and Wire Nails.—As in most other finished lines, the new business has not been particularly heavy, although mills are not at this time anxious to take on heavy additional business on account of the rushed condition of the mills on old business. Prices remain firm at figures which have prevailed since January and no shading has been done as far as can be learned. We quote:

Wire nails, jobbers' carload lots, $1.85; retailers' carload lots, $1.90, and less than carload lots, $2; painted barb wire, $2 for jobbers in carloads; retailers in carloads, $2.05, and less than carloads, $2.15, with 30c for galvanizing; plain wire $1.70 to jobbers and $1.75 by carload.

Plates.—Mills of the leading interest are full on old contracts, but outside interests with promises of fair delivery are in shape to take business at slightly shaded prices. New business has been only fair. We quote:

Tank plate ¼ inch thick, 6¼ to 100 inches, 1.60c f. o. b. mill, Pittsburg. Extras are as follows per 100 pounds, boiler and flange steel plates, .10c; A. B. M. A. and ordinary firebox steel plates, .20c; still bottom steel, .30c; marine steel, .40c; locomotive firebox steel, .50c; all sketches excepting straight taper plates, varying not more than 4 inches, in width at ends, narrowest end not being less than 30 inches, .10c; complete circles, .20c. Plates in width over 100 inches up to 110 inches, .05c; over 110 inches up to 115 inches, .10c; over 115 inches up to 120 inches, .15c; over 120 inches up to 125 inches, .25c; over 125 inches, up to 130 inches, .50c; over 130 inches, 1.00c. Gauges under ¼ inch to and including 3-16 inch plates on thin edges, .10c; under 3-16 inch to and including No. 8, .15c; under No. 8 to and including No. 9, .25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Merchant Bars.—With inquiries only fair and but little new business being placed the prevailing quotation is 1.60c Pittsburg, for bar iron and even this has been shaded on common iron bars, but the shade was very small. At a meeting of steel bar manufacturers in this city last week it was decided to make no changes at present, but to hold at the present price of 1.50c for steel bars, to implement makers. We quote:

Common iron bars, 1.60c to 1.65c in carload lots, 1.70c in less than carloads; Bessemer steel bars, 1.50c; open-hearth steel bars, 1.50c; plow and cultivator, 1.50c net; channels, angles, zees and tees, under 3 inches, 1.60c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds .10c advance, less than 1,000 pounds, of a size, .30c advance.

Merchant Steel.—Specifications against old contracts have been heavy, but new business has been comparatively light. Steel bar makers at their meeting last week decided to make no concessions at this time to implement makers on contracts for the season beginning July 1. On some sizes of steel bars mills are still behind on deliveries. We quote:

Cold rolled and ground shafting, 50 per cent off in carload lots, and 45 off in less than carloads, delivered in base territory; tire steel, 1.70c to 1.80c; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flat, 1.50c to 1.55c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.05c to 2.10c. The price of planished and machine straightened tire is 1.70c base half extras as below. Iron finished tire up to 1½ inch by ½ inch 1.65c base half extra tire list. Iron finished tire 1½ inch by ½ inch and over to be sold on regular bar basis of 1.50c base, half extra steel card.

Sheets.—There is some new business in sheets, but it is not in large volume. The independent makers in the market for sheet bars have complained about the advance in price to $28, but as far as can be learned this has not been shaded. The scarcity of sheet bars has in many instances prevented maximum operations and there is no improvement in sight to help out this situation. We quote:

Black steel sheets, box annealed, cold rolled, one pass: Nos. 11-12, 2c; Nos. 13-14, 2.05c; Nos. 15-16, 2.10c; Nos. 17-21, 2.15c; Nos. 22-24, 2.20c; Nos. 25-26, 2.25c; No. 27, 2.30c; No. 28, 2.40c. Galvanized, Nos. 10-11, 2.35c; Nos. 12-14, 2.45c; Nos. 15-16, 2.55c; Nos. 17-21, 2.70c; Nos. 22-24, 2.85c; Nos. 25-26, 3.05c; No. 27, 3.25c; No. 28, 3.45c. Corrugated roofings, 1.70c per square for No. 28 painted, 2½-inch corrugation; 3.05c per square for No. 28 galvanized, 2½-inch corrugation. Quotations f. o. b. Pittsburg on large lots.

Tin Plate.—While mills are running as fully as possible considering the scarcity of bars, in order to make deliveries on old contracts the new business is practically nothing.

We quote: $3.50 per base box, f. o. b. Pittsburg, 14 x 20 100-pound cokes, terms 30 days, less two per cent off for cash in 10 days.

Old Material.—Scrap has been a weak feature in this market for the past two months and no improvements have been in evidence during the week under review. Mills are not buying, but there have been a few transactions between brokers. Dealers are undecided what to do and some feel that the bottom has been reached while others look for a still further decline before there will be an advance. We quote gross tons, Pittsburg: Heavy melting stock, $14.50 to $14.75; old steel rails, rerollers, $15.50 to $15.75; No. 1 cast scrap, $14.50 to $14.75; cast borings, $8 to $8.25; bundled sheet scrap, $13.75 to $14; No. 1 railroad wrought $17 to $17.25; No. 1 yard faggoting scrap, $16.50 to $17; low phosphorus scrap, $17 to $17.25; wrought turnings, $11 to $11.50; busheling scrap, $13.50 to $14; iron axles, $24 to $24.50.

Coke.—The settlement of the coal strike as far as the soft coal miners in the Pittsburg district is concerned has not had any weakening effect on the coke situation, in view of the fact that the miners have not settled with the anthracite operators. Strictly Connellsville foundry coke is quoted $3 to $3.25 and furnace coke $2.60 to $2.85, ovens. The estimated output of the Connellsville region during the week ending March 24, was 269,162, a decrease of about 13,000 tons in comparison with the previous week. The lower Connellsville estimated production was 99,374 tons.

Freight rates per ton of 2,000 pounds from the Connellsville region, which includes any part of it, to the principal points of consumption, are as follows:

To Pittsburg	$ .80
To Mahoning and Shenango Valleys	1.30
To Boston	3.50
To Baltimore	2.05
To Buffalo, N. Y.	1.85
To Cairo, Ill.	2.80
To Detroit, Mich.	2.25

To Chicago, Ill.	2.65
To Cincinnati, O.	2.10
To Cleveland, O.	1.60
To Columbus, O.	1.65
To Joliet, Ill.	2.65
To Louisville, Ky.	2.65
To East St. Louis	2.80
To Elwood, Ind.	2.35
To New York	2.75
To Toledo, O.	2.25

CHICAGO.

Nearly all Manufacturers Well Supplied with Coal.—Bar Tonnage Light.

Office of *The Iron Trade Review*,
1164 Monadnock Block, April 2 5

The crisis in the coal fields has not materially disturbed local iron and steel interests. With the exception of bar iron makers, most of the manufacturers have ample stocks of coal on hand, and little fear is entertained that there will be any noticeable suspension of activities. None of the bar iron mills, however, has more than four to six weeks' fuel supply on hand, and should the strike be protracted beyond that period, some of them will doubtless shut down. The Republic Iron & Steel Co. has already closed its St. Louis plant because of the lack of storage facilities there. Neither has the coal strike had any appreciable effect on trading, other than to create an improved demand for spot shipment coke and pig iron. An attractive price was named by some coke dealers last week on contracts for forward deliveries, and a round tonnage was closed up at the prices offered. The only interesting pig iron transaction was the purchase of 10,000 tons of basic iron from valley furnaces by the Inland Steel Co. for second and third quarter deliveries. Northern iron is softer and is now offered at $18.75 Chicago. Rail tonnage continues of an active nature, the Carnegie Steel Co. having closed an aggregate of 30,000 tons during the week, among which was the Pere Marquette order for 10,000 tons. Intermediate steel products are scarce, wire rods having been advanced $1 a ton during the week by the American Steel & Wire Co. New tonnage in iron and steel bars is light. The price of iron bars was reduced $1 a ton to buyers of 100 tons and over at a meeting of the Western Bar Iron Association, held in Chicago today, and the local quotation to these interests is now 1.66½c. There is considerable tonnage under negotiation for steel, although in the face of the refusal of the Steel Bar Association to make any concession from present prices on next season's requirements, it is not expected there will be any large volume of trading for the present. Scrap shows no gain in strength and buying is reduced to a minimum. Sheets also continue weak. The demand for wire products is of the most insistent kind, the leading producer having almost four months output on its order books.

Pig Iron.—A slightly improved feeling is noticed in the local market. Prices are not any stronger, but there is more quiet trading. The coal strike has added to the uncertainty of the situation, and as a result there is a general tendency on the part of melters to sound the market. Furnaces are also becoming anxious for third-quarter business, and are actively drumming their trade for orders for that delivery. Southern iron is without any appreciable change, $13.75 Birmingham for No. 2 foundry representing the minimum quotation that has been named in this market. Northern irons are softer, and $18.75 has been named by local stacks on No. 2 foundry for the last half. For quick shipment, 25 cents a ton more is asked from local consumers, although at points east of this city where Ohio furnaces compete more actively with Chicago producers, it is understood the latter are meeting the prices of the former interests. The Inland Steel Co., of this city, bought 10,000 tons of basic iron towards the end of last month from valley furnaces for delivery in the second and third quarter. The southern product is still held at $18.40 Chicago, with deliveries very irregular. The Sloss-Sheffield Steel & Iron Co., which had been holding out for the $14.50 schedule, has withdrawn the same for the last half, and is now quoting on the basis of $14 for No. 2 for that period. This interest has put out of blast its "Hattie Ensley" furnace at Sheffield, and the "Florence" at Florence, Ala. The malleable inquiries under negotiation with local furnaces two weeks ago have been withdrawn because of the unattractive prices obtained, the minimum local quotation being $19 Chicago. Our quotations are as follows:

Lake Superior charcoal	$20.00 to 20.50
Northern Foundry No. 1	19.25 to 19.75
Northern Foundry No. 2	18.75 to 19.00
Northern Foundry No. 3	18.25 to 18.75
Northern Scotch Foundry	19.25 to 19.75
Ohio Strong Softeners No. 1	20.30
Ohio Strong Softeners No. 2	19.80
Southern Foundry No. 1	18.15 to 18.40
Southern Foundry No. 2	17.65 to 17.90
Southern Foundry No. 3	17.15 to 17.40
Southern Foundry No. 4	16.90 to 17.15
Southern No. 1 Soft	18.15 to 18.40
Southern No. 2 Soft	17.65 to 17.90
Southern Gray Forge	16.40 to 16.90
Southern Mottled	16.15 to 16.65
Southern Silveries (4 percent to 6 percent Silicon)	18.40 to 18.90
Jackson Co. Silveries, 8 to 10 percent Silicon	23.30 to 24.30
Alabama and Georgia Car Wheel	22.65
Malleable Bessemer	19.00 to 19.25
Basic Iron	18.40

Rails and Track Supplies.—Sales of rails in this city were mostly to trolley lines. The Carnegie Steel Co., through its various offices, closed last week an aggregate of 30,000 tons, among which was the Pere Marquette order for 10,000 tons. The demand for light rails has fallen off with the commencement of the coal strike. The local mills, however, are not short of tonnage, having contracts and specifications in hand to run them at least three months. There is an ever pressing demand for track supplies. On spikes the Illinois Steel Co. is out of the market except for the last quarter, and mills in position to give deliveries are getting good prices for their output, 2.20c being the minimum of local sellers. We quote standard sections, f. o. b. mill, $28; light rails, 30 to 45-pound sections, $27 to $28; 25-lb. $28 to $29; 20-lb., $29 to $30; 16-lb., $30 to $31; 12-lb., $31 to $32; and light sections down to 8-lbs., $38 to $40, all f. o. b. mill. Track supplies are quoted as follows: angle bars, 1.50c to 1.75c; spikes (for quick shipment) 2.20c to 2.25c; (for forward deliveries,) 2.05c to 2.10c; track bolts 2.65c to 2.75c, base, square nuts.

Coke.—The coal strike has started a brisk inquiry for coke. A large tonnage was closed last week for deliveries running through the year, buyers then being allowed to contract on the basis of $5.65 Chicago for standard 72-hour Connellsville brands, and at $5.50 to $5.65 Chicago for Solvay coke. These prices, however, have since been retired, and both Connellsville and Solvay cokes are now held firmly at $5.80 Chicago, either for spot shipment or forward delivery. Coke on track is scarce, and all offerings are quickly snapped up.

Billets and Rods.—Demand for forging billets continues of an active nature. Prices are firm at $35 Chicago, the recent advance in sheet bars having further strengthened the local market. Rods have also shared in this added strength, local mills now asking $37 Chicago, an advance of $1 a ton over last week's quotations.

Iron and Steel Bars.—Keen interest is displayed in the iron and steel bar situation by consumers of both products. The meeting of the Steel Bar Association in Pittsburg last week, at which present prices were reaffirmed, was followed by a meeting today in Chicago of representatives of the western bar iron mills. At this meeting, a concession of $1 a ton from the flat rate of 1.71½c Chicago, was made in favor of those buyers whose orders exceed 100 tons, and the higher price reaffirmed on all orders for less than this amount. This revision of the schedule places bar iron to the preferred customers on a parity with steel in Chicago, and its announcement is expected to stimulate a brisk demand from these interests. Very little new tonnage has been booked of late for either product, the dullness being especially severe in iron. A considerable steel tonnage is under negotiation from implement interests, but the contracts closed thus far for next season's delivery are of little moment. Some of the larger con-

sumers, it is rumored, will be allowed to over-specify on their present contracts as an inducement to come in on the basis of 1.50c Pittsburg for next season's requirements, though this report is not given credence in official quarters. We quote carload lots, Chicago delivery, as follows:

Bar iron, 1.71½c; soft steel bars and bands, 1.66½c half extras; soft steel angles, less than 3 x 3, 1.76½c; hoops, 2.06½c base, full extras; old rail stock, 1.70c to 1.80c. There is a good movement from local warehouses and jobbers' prices are firm. We quote bar iron, 2.25c full extras; soft steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛ inch and larger, $2 per 100 pounds base; flats, 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $1.95 to $2.00 half extras; soft steel hoops, $2.30 to $2.40 full extras. Other sizes not mentioned above, $1.85 per 100 pounds base, plus half extras.

Sheets.—Specifications for sheets show no diminution. Mills are operating to full capacity on both black and galvanized, in some cases being slow on their deliveries. New tonnage is eagerly sought after, especially by the independent mills, whose order books are none too full for the last half. The larger dealers, however, who bought heavily last year, control the local situation, quoting prices from $2 to $3 a ton below the present schedule. All the independent mills are meeting the rebate of $1 a ton offered by the leading producer. With these reservations, we quote the schedule of prices of the leading producer, Chicago delivery, as follows:

Nos. 8, 9 and 10, 1.86½c; Nos. 11 and 12, 1.91½c; Nos. 13 and 14, 1.96½c; Nos. 15 and 16, 2.06½c. Box annealed, Nos. 18-20, 2.26½c to 2.31½c; Nos. 22-24, 2.36½c; No. 26, 2.41½c; No. 27, 2.46½c; No. 28, 2.56½c; No. 29, 2.71½c; No. 30, 2.81½c. Jobbers' prices are as follows: No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; Nos. 18 and 20, 2.50c to 2.55c; Nos. 22 and 24, 2.55c to 2.60c; No. 26, 2.60c to 2.65c; No. 27, 2.65c to 2.70c; No. 28, 2.70c to 2.75c; No. 30, 3.15c to 3.20c.

Quotations on galvanized shipments, carload lots, mill shipments, are as follows: Nos. 10-11, 2.51½c; Nos. 17-21, 2.86½c; Nos. 22-24, 3.01½c; Nos. 25-26, 3.21½c; No. 27, 3.41½c; No. 28, 3.61½c; No. 29, 3.86½c; No. 30, 4.11½c. From store, galvanized sheets are quoted as follows: Nos. 10 and 20, 3c to 3.10c; Nos. 22 and 24, 3.15c to 3.25c; No. 26, 3.35c to 3.45c; No. 27, 3.55c to 3.65c; No. 28, 3.75c to 3.85c; No. 30, 4.95c to 5c.

Merchant Steel.—There is no change in the local situation. Inquiries for requirements in the last half are growing, and a fair amount of business has been closed. It is expected the present month will see a very active demand for all forms of merchant steel. Specifications against old contracts continue heavy, mills experiencing considerable difficulty in keeping pace with same. Prices are without change, mill shipments, Chicago delivery, being quoted as follows:

Spring steel, 2.10c; sleigh shoe, flat sizes, 1.71½c; concave and convex, 1.86½c; cutter shoe, 2.35c to 2.40c; smooth finished machinery steel, 1.91½c; smooth finished tire, 1.86½c base; plow steel, 2.20c and upward, according to quality; toe calk steel, 2.21c; railway spring, 1.86½c. Cold rolled shafting, 50 per cent off in carload lots and 45 per cent in less than carload lots. Crucible tool steel, 6½c to 8c; special grades of tool steel, 13c and up.

Plates.—The improvement in this product that commenced a few weeks ago continues in an undiminished degree. Specifications are active, the local mill having enough tonnage on its books to run it several weeks. New tonnage is also coming forward in a gratifying manner, and the outlook is bright. Chicago mill prices for carload lots are as follows:

Tank steel, ¼ inch and heavier, up to 100 inches wide, 1.76½c base; flange steel, 1.86½c base; marine steel, 1.96½c base; all full extras. Plates 3-16 inch thick, $2 extra; gauges, 7 to 8, $3 extra; No. 9, $5 extra. Less than carload lots, $5 extra. Store prices are very firm. We quote from local stocks: tank steel ¼ inch and heavier, up to 72 inches wide, 2c to 2.10c; 72 inches to 96 inches wide, 2.10c to 2.20c; 3-16 inch up to and including 60 inches wide, 2.10c to 2.20c; 3-16 inch 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.15c to 2.25c; flange steel, 25c extra; heads, 25c extra.

Structural Steel.—The local market is without noticeable change. Jobbers are doing a brisk business in small lots, but mills are slack. The Carnegie Steel Co. is catching up on its orders, and can now give delivery on new business inside of three months. The South Chicago structural mill established a new record last month, rolling upwards of 16,000 tons in this period. Building continues active in this city, and all the local yards are busy. We quote mill shipments, Chicago delivery, as follows:

Beams and channels, 3 to 15 inches, inclusive, 1.86½c; angles, 3 to 6 inches, 1.86½c; angles, larger than 6 inches, on one or both legs, 1.96½c;, beams larger than 15 inches, 1.96½c; zees, 3 inches and over, 1.86½c; tees, 3 inches and over, 1.91½c, with the usual extras for cutting to exact lengths, punching, coping, bending, or other shop work. Quotations on lots from store are as follows: All angles, 3 inches and larger, $2.25 per 100 pounds base; tees, 3 inches and larger, $2.30 per 100 pounds base; 3, 4, 7, 8, 9, 12 and 15-inch beams, $2.25 per 100 pounds base; 5, 6 and 10-inch beams, $2.50 per 100 pounds base; 18, 20, and 24-inch beams, $2.35 per 100 pounds base; 3, 4, 7, 8, 9, 10, 12 and 15-inch channels, $2.25 per 100 pounds base; 6 and 10-inch, 15-pound channels, $2.50 per 100 pounds base; 12-inch, 20½ pound channels, $2.35 per 100 pounds base; 5-inch channels, $2.75 per 100 pounds base.

Merchant Pipe.—Demand for pipe is active, both new tonnage and specifications coming forward freely. With the opening of lake navigation this month, it is expected a more active movement for this product will set in. Prices are without change, carload lots, f. o. b. Chicago being uniformly maintained as follows: ¾ to 6-inch black steel pipe, 78.35 per cent discount from list, and galvanized 68.35 per cent. From store minimum quotations are 76½ to 77 per cent discount on the base sizes ¾ to 6-inch black steel pipe.

Boiler Tubes.—No changes have occurred within the period under review. Demand is very good and prices firm. Official discounts are as follows:

	Steel	Iron	Seamless
1 to 1¼ inches	40.35	37.35	53.00
1¾ to 2¼ inches	54.35	39.35	40.00
2½ inches	56.35	44.35	43.00
2¾ to 5 inches	62.35	51.35	
Up to 4¾ inches			50.50
6 to 13 inches	52.35	37.35	

Less than carload lots, from store, as follows:

	Steel	Iron	Seamless Steel
1 to 1¼ inches inclusive	40	35	42½
1¾ to 2¼ inches, inclusive	50	35	35
2½ inches, inclusive	52½	35	30
2¾ to 5 inches, inclusive	60	47½	42½

Cast Iron Pipe.—A brisk demand for gas pipe has been felt in the last week, the United States Cast Iron Pipe & Foundry Co. having closed contracts for this product aggregating 8,000 tons. The company also secured the Cleveland contract of 1,100 tons. The only new municipal inquiry is one from Cincinnati for 500 tons of water pipe. Prices are without change as follows:

4-inch water pipe, $31; 6, 8, 10 and 12-inch $30; larger sizes, $29.50; gas pipe, $1 extra.

Wire Products.—No cessation is noted in the demand from any section of the country. The leading interest has orders on its books that will tax

its output for the next three or four months. Stocks everywhere are low, and requests for instant relief are not only of the most insistent kind but are innumerable in quantity. As soon as the roads harden, permitting the farmers to get into town, it is expected the consumption of wire products will exceed all previous figures. The manufacturing trade is also specifying freely, and in this department the American Steel & Wire Co. is considerably behind its orders. Prices are very strong, carload lots to jobbers, Chicago delivery, being as follows:

Wire nails, $2; painted barbed wire $2.15; galvanized barbed wire, $2.45; smooth annealed wire, $1.85; smooth galvanized wire, $2.15; polished staples, $2.15; galvanized staples, $2.40. Carload lots to retailers, 5 cents higher than above prices; less than carload lots, 15 cents higher.

Old Material.—The market continues very susceptible to pressure. Demand is of light proportions and practically all the trading is done at concessions. From present indications, the coal strike is apt to prolong the present sluggish condition of the market. Few, if any, of the western bar iron mills have more than a month's supply of coal on hand or under contract, and, should the coal strike be of protracted duration, some of the mills will have to shut down. Country and city dealers are burdened with large stocks of scrap, but are offering little just now in the hope of holding prices on their present level. The only new railroad list out is that of the Chicago & Northwestern, amounting to 1,200 tons. We have revised some of our prices, and quote as follows, gross tons being given in the first paragraph:

Old Steel Rails (4 feet and over)	$15.00 to 15 50
Old Steel Rails (less than 4 feet)	14.00 to 14.50
Old Car Wheels	18.50 to 19.00
Old Iron Rails	21 00 to 21.50
Relaying Rails, subject to inspection	27.00 to 27 50
Heavy Melting Steel	13.00 to 13.50
Mixed Country Steel	11.50 to 12.00

We quote as follows, net tons:

No. 1 R. R. Wrought	$14 50 to 14.75
No. 2 R. R. Wrought	13.50 to 13 75
Shafting	16.00 to 16 50
Dealers' Forge No. 1	12.00 to 12.50
Wrought Pipe and Flues	10.50 to 10.75
No. 1 Cast, 150 pounds and less	12.00 to 12.50
No 1 Mill	9.50 to 9.75
No. 1 Busheling	10.00 to 10.50
No. 2 Busheling	9.50 to 10.00
Country Sheet	8.00 to 8.50
No. 1 Boilers Cut	10.00 to 10.50
Boiler Punchings	12.50 to 13.00
Iron Car Axles	21.75 to 22 00
Steel Car Axles	18.00 to 18.75
Iron Axle Turnings	10.50 to 11.00
Cast Borings	8.75 to 9.00
Mixed Borings, etc	8.75 to 9.00
Machine Shop Turnings	10.75 to 11.00
Ralroad Malleable	13.50 to 14.00
Agricultural Malleable	12.50 to 13.00
Stove Plate and Light Cast Scrap	10.50 to 11.00
Old Iron Splice Bars	17.50 to 18.00

The Cleveland Armature Co., Cleveland, O., has a new factory building well under way.

CLEVELAND.

Belated Buying of Ore.—Strong Competition on Pig Iron.—Spelter Advanced.

OFFICE OF *The Iron Trade Review*,
BROWNING BUILDING, April 2.

Iron Ore.—There has been some selling during the past week, one lot of more than 50,000 tons and some odd lots being placed. In fact, a small business in odds and ends to piece up uncovered requirements is going on all the time, but this is only of moderate volume. A few furnaces which were expecting an earlier opening of navigation are running short, and there is considerable inquiry in this connection, especially for Bessemer, which is exceedingly scarce. Eastern furnaces which were considered badly off in this regard are really better supplied than some valley furnaces. The threatened labor difficulties on the lakes are rapidly clearing away, a settlement of some important points of difference being reported almost daily, and from present appearances the opening of navigation will be free from trouble in this connection. Heavy ice remains in the upper lakes and predictions for the date of arrival of the first vessels at Lake Erie ports vary from April 20 until May 1.

Pig Iron.—The feature of the week in the local market has been the development of a heavy inquiry for foundry iron. The Westinghouse interests entered the market for about 5,000 tons, Cleveland delivery, during the second half. Strong competition developed for the business, and a recurrence of the cutting which has been done at various times in the last few weeks is practically certain, in spite of the fact that this purchase will have considerable weight in establishing the price for second half delivery. Besides this item, inquiries are in increased volume, mostly to fill out uncovered requirements for the second quarter, though a few run into the second half. Specifications are insistent and many instances of delaying buying are seen in the entrance of consumers into the market for good tonnages for April delivery. Considerably lower than $17 furnace has been done in this section for No. 2 foundry and $17.50 delivered is evidently the level for Cleveland furnaces. Practically no southern iron is selling locally. Bessemer continues its firm tone at $17.50 for small lots with $17.25 possible for round tonnages. The corporation is expected to take the small April balance. Some inquiries have developed for basic for second half delivery, the first half supply being practically gone. An important Pittsburg interest is reported short for second quarter delivery. The price is firm at $17 with a strong demand toward $17.25. Furnace coke has advanced sharply during the week and all grades are strong with the continued uncertainty of the coal situation. A number of producers have temporarily withdrawn from the market. For furnace grades the price is $2.75 to $3 ovens, and for foundry $3 to $3.25. We quote Cleveland delivery as follows:

Bessemer	$18.10 to 18.35
No. 1 Foundry	18.00 to 18.50
No. 2 Foundry	17.50 to 17.50
No. 3 Foundry	17.50
No. 2 Southern	17.85 to 18.10
Gray Forge	16.35 to 16.85
Gray Forge, Southern	15.85 to 16.35
Lake Superior charcoal	19.50 to 20 00

Finished Materials.—Spikes have advanced from 1.95c to 2.00c. In structural materials specifications continue heavy and jobbers report a strong demand, but the volume of new business is somewhat lighter, the tendency being manifested in less willingness to pay premiums. Building is heavy, however, with several new manufacturing plants begun during the past week and the let-up is not extensive. Plates are procurable for early delivery and are not in strong demand. Sheets are firm and selling readily. Billets are exceedingly scarce, and sheet bars are in good demand with unchanged prices. Bar iron is easy at 1.65c and 1.70c, Ohio mills.

Old Material.—Better inquiries are reported, but no extensive buying movement has developed and prices continue on the same low level. Improvement, however, is expected at any time. We quote f. o. b. Cleveland as follows:

Old Iron rails	$20.00 to 21.00
Old steel rails (over 6 feet)	16.00 to 16.50
Old steel rails (under 6 feet)	16.50 to 17.50
Old car wheels	16.00 to 16.50
Steel boiler plate	12.00 to 13 00
Steel axles	19 00 to 20 00
Malleable iron (railroad)	14 00 to 14 50
Malleable iron (agricultural)	12 50 to 13.00
Heavy steel	14 00 to 14.50
Country mixed steel	12.50 to 13.00

We quote net tons, as follows:

No. 1 R. R. wrought	14 50 to 15.00
No 1 busheling	12.50 to 13 00
No. 1 machine cast	13.25 to 13.70
Iron axles	22.00 to 23.05
Axle turnings	11 00 to 12.00
Wrought turnings (free from cast)	9.00 to 10.00
Grate bars	9.50 to 10.00
Pipes and flues	11 50 to 12.00
Tank iron	10.50 to 11 00
Hoop and band iron	7.50 to 8.00
Sheet iron	6.50 to 7.00
Wrought drillings	9 00 to 10.00
Stove plate	10.00 to 10.50
Cast borings	7.50 to 8.00

CINCINNATI.

Only One Inquiry of Importance for Pig Iron.—Little Change in Conditions.

April 3, 1906.

Pig Iron.—The market the past week presents but little that is interesting. The inquiry of the Westinghouse Electric Manufacturing Co., for 12,000 tons of foundry irons, for third and fourth quarter delivery, part to go to Cleve-

land and part for Pittsburg, is about the only inquiry of importance that has come to light. So far as sales are concerned, the bulk of the orders have been of small lots to cover immediate needs, but it is to be noted that this class of business is increasing. On business for second quarter delivery, good full prices have been obtained in some cases which serve as an evidence that there is not such a plentiful supply of all grades for second quarter delivery. Strictly spot iron is rather slow sale and is hard to place. One of the large southern producers has decided to meet the current market and is quoting $14 Birmingham instead of holding out for $14.50. In fact, it is now well established that $14.00 is the full quotation for southern iron while $13.75 is actually the going price in the trade, and a $13.50 price comes out occasionally on some business taken quietly. In northern iron there is not enough being done to establish prices, but the trade recognizes $16.50 to $17.00 for No. 2 foundry as the market at southern Ohio furnaces. There have been some good sized inquiries for malleable iron which are still pending. The situation has shown no change, and we are one week nearer a buying movement. At what price such a movement will commence is not determinable, but all reports indicate that the furnace men's position is strong and in spite of the recent slight decline in prices the market is really steady and strong with the lack of orders for new tonnage the only thing that looks weak. We quote f. o. b. Cincinnati.

Southern Foundry No. 1	$17.00 to 17.50
Southern Foundry No. 2	16.50 to 17.00
Southern Foundry No. 3	16.00 to 16.50
Southern Foundry No. 4	15.50 to 16.00
Southern Foundry No. 1, soft	17.00 to 17.50
Southern Foundry No. 2, soft	16.50 to 17.00
Gray Forge	14.75 to 15.25
Northern Foundry No. 1	18.15 to 18.65
Northern Foundry No. 2	17.65 to 18.15
Northern Foundry No. 3	17.15 to 17.65
Jackson County Silvery, 8 per cent	21.15 to 21.65
Southern Charcoal	22.75 to 23.25

Finished Material.—The jobbing demand continues good and the market is firm for all steel products. Mill deliveries are somewhat improved on plates, and structural is improved as to deliveries.

Bar iron is quoted 1.75c to 1.80c and the recent advance in sheets is well sustained. We quote: steel bars at 1.63c, half extras, with dealers quoting 1.85c for iron and steel out of store. Galvanized sheets. No. 10 and No. 12, in car lots are 2.58c. We quote black sheets, No. 27 at 2.40c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.85c; No. 27, 2.75c; No. 16, 2.35c; No. 14, 2.25c; No. 12, 2.15c. Tank plates are firm and sell out of store at 2 to 2.10c for ¼-inch and 2.10c for 3-16, Nos. 8 and 10. Beams and channels are quoted at 2.25c to 2.35c from stock and angles at 2.10c to 2.15c for base sizes.

In merchant pipe the market continues unchanged. Quotations for wrought iron pipe are still withheld and only furnished upon application with specifications. We quote f. o. b. Cincinnati:

MERCHANT PIPE.
(Basing Discounts)

	Steel Pipe		Guaranteed Wrought Iron Pipe	
	Black Per cent	Galv. Per cent	Black Per cent	Galv. Per cent
⅛ and ¼ inches	69.7	53.7	....	....
⅜ inch	73.5	61.3	....	....
½ inch	73.7	61.7	....	....
¾ to 6 inches	77.7	67.7	....	....
7 to 12 inches	72.7	57.7	....	....

Coke.—There has been a firmer tendency in the coke market in view of the coal strike situation, but prices are not materially higher and the following figures represent prices in the leading coke producing districts.

Wise County, Va. Furnace Coke prompt shipment	$2.50 per ton
Wise County, Va. Foundry Coke prompt shipment	3.00 to 3.25 per ton
Pocahontas Furnace Coke on contracts	$2.25 to 2.50 per ton
Pocahontas Foundry Coke on contracts	2.75 to 3.00 per ton
Connellsville Furnace Coke prompt shipment	2.50 per ton
Connellsville Foundry Coke prompt shipment	3.00 to 3.25 per ton
New River Foundry Coke on contracts or prompt shipment	3.00 to 3.25 per ton
New River Furnace Coke, prompt shipment	2.50 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.65 per ton on $9.00 pig iron, plus 17 per cent of the advance on pig iron above $9.00 Birmingham

Old Material.—An easy tone prevails and the market is quiet and unsettled. We quote f. o. b. Cincinnati.

Old No. 1 railroad wrought, net tons	$14.00 to 14.50
Cast machine and foundry, net tons	12.50 to 13.00
Old iron rails, gross tons	20.00 to 20.50
Old steel rails, gross tons	15.50 to 16.00
Old short lengths, gross tons	16.00 to 17.00
Old iron axles, net tons	22.00 to 23.00
Stove plate, net tons	10.00 to 10.50
Wrought turnings, net tons	9.50 to 10.00
Cast borings, net tons	7.00 to 7.50
Car wheels, net tons	16.00 to 16.50

The Robert Field Sales Agency, has removed its offices from the Traction building, to more commodious quarters in the First National Bank building. The change was made necessary owing to the increased business of the firm and the need for more room.

PHILADELPHIA.

Situation Strong Except for Strike Feature.—Iron Prices Stationary.

April 3.

Pig Iron.—Pending the settlement of the labor troubles in the coal regions, regarding which feeling is much more optimistic, the market has been almost at a standstill. Many producers have refused to accept any more orders until they can know exactly where they will stand, and consumers, largely for the same reason, have refrained from any considerable efforts at buying. The natural result is that prices have remained stationary. The marked advance in the price of coke has put all concessions in pig iron out of the question. Aside from the latter cloud the general situation is regarded as excellent, and if the anthracite operators and miners succeed in speedily patching up their differences, a strong buying movement is expected to follow very soon. While this is not likely to lead to any very marked advances in prices it is confidently believed that it will enable the furnace men to successfully maintain the present figures, which are generally satisfactory to them. One of the Birdsboro furnaces has been blown out for repairs, thus slightly reducing the available local supply of pig iron. Orders, as has already been said, have been few and small during the week, and prices remain substantially unchanged from last week, as follows:

No 1X Foundry	$19.00 to 19.50
No. 2X Foundry	18.50 to 18.75
No. 2 Plain	17.50 to 18.00
Standard Gray Forge	16.50 to 16.75
Basic	17.75 to 18.00
Low Phosphorus	25.00 to 26.00
Southern No. 2X. rail	18.75 to 19.00

Finished Material.—There is a distinctly more cheerful feeling, now that it is settled that there will be no coal strike in Pittsburg territory, and orders which have been held up during the past few weeks are beginning to come out more freely. Some trade experts look for a great buying movement in May, which will insure ceaseless activity throughout 1906. The demand for bar iron has improved greatly, thus removing one source of weakness. Prices may be quoted as follows: Beams, channels and angles according to specifications, 1.83½c to 1.93½c; refined iron bars, 1.63½c to 1.73½c; steel bars, 1.63½c to 1.73½c; plates, 1.73½c to 1.83½c.

Old Material.—Scrap continues to advance in price in several lines, owing to the renewal of orders from the mills. Old car wheels, which were in great demand a short time ago, have lost a little of their increased price, but in general the situation is better than it has been for many weeks, and a steady improvement is looked for in sympathy with the general trend of the iron and steel markets. Prices may be quoted as follows:

Old steel rails	$16.50 to 17.00
No. 1 steel scrap	16.50 to 17.00
Old steel axles	20.50 to 21.00
Old iron axles	25.00 to 26.00
Old iron rails	20.00 to 21.00
Old car wheels	17.50 to 18.00
Choice scrap, R. R. No. 1 wrought	20.00 to 20.50
No. 1 yard scrap	18.00 to 19.00
Machinery scrap	15.75 to 16.25
Low phosphorus scrap	21.00 to 21.50
Wrought iron pipe	15.00 to 15.50
No. 1 forge fire scrap	14.50 to 15.25
No. 2 forge fire scrap, ordinary	11.00 to 11.50
Wrought turnings	13.25 to 13.75
Axle turnings, heavy	14.50 to 15.00
Cast borings	10.25 to 10.75
Stove plates	12.00 to 12.75

NEW YORK.

Pig Iron Develops a Small Buying Spurt.—Coal Strike Strengthens Demands of Producers.—A Good Week in Shapes.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., April 2.

Pig Iron.—A small buying spurt developed in the pig iron market in the last days of the week, the significance of which is not yet apparent. The end of the coal miners' conference has probably had something to do with the renewal of inquiries; at any rate buyers have again appeared in the market in goodly numbers and sales during the past two days have been considerable, although the total of the week is still far below the present rate of consumption. The week's contracts for foundry, basic and forge irons will probably foot up to 30,000 tons and an equal amount is now under negotiation. Pipe works and manufacturers are the principal buyers of foundry stocks although there is the usual movement of small lots for early delivery to regular customers. About 4,000 tons of basic, also for short time delivery, went to a steel mill in eastern Pennsylvania. Very little, if any, business for shipment later than July 1 has been taken. Whether the present spurt will continue or die an early death depends entirely upon developments in the coal mining districts. Consumers have been expecting lower prices and not without some reason, for the offers made them during the past slack weeks have been many and eager. The general outlook is still doubtful. If the coal strike becomes at all widespread with attendant difficulties of transportation, prices of pig iron will naturally go higher. The foundries in this section are all busy. There have been sales of Alabama iron on the basis of $14.50, Birmingham, also at $14.00 and less, and concessions by northern producers have not been rare, but the chief producers still insist upon unchanged quotations and suggest advances in the future. Ferromanganese has been quiet, but conditions in the ore producing districts have not improved materially and it is doubtful whether prices will resume their normal level for some time to come. Coke is in demand for reserve stock and prices are pursuing an extremely irregular course upward. Some makers refuse all orders, but sales have been many and large. The following are prices of pig iron at tidewater.

Northern No. 1 Foundry	$18.25 to 18.75
No. 2 Foundry	17.75 to 18.25
No. 2 Plain	17.50 to 18.00
No. 1 Southern Foundry	18.00 to 18.50
No. 2 Southern Foundry	17.50 to 18.00
No. 3 Southern Foundry	16.75 to 17.25
No. 4 Foundry	16.50 to 17.00

Certificates and Warrants.—Trading in certificates, warrants and the new foundry contracts on the New York Produce Exchange has not been brisk but the prevailing tone has been firm. Only one sale is recorded, 100 tons of April foundry at $16.50. Prices of warrants and standard contracts follow:

Warrants:

	Bid.	Asked.
Cash	16.10	....
April	16.00	16.75
May	16.00	17.00

Standard contracts:

	Bid.	Asked.
Cash	17.50	18.00
April	17.50	18.10
May	17.50	18.00
June	17.20	18.00
October	17.00	17.60

Finished Iron and Steel.—Increased business in structural material has been the feature of the week. The total bookings will aggregate well over 100,000 tons. The report that another contract for 30,000 tons of bridge material for bridges in Korea had been placed by a Japanese firm is denied by those most concerned and it is supposed that the scale referred to is the same as that recorded in these pages some weeks ago. The American Bridge Co. secured enough of the new business offered to increase its total for the month of March to a little more than 60,000 tons. This includes no large individual orders and represents about 40 per cent of the business offered during this period. There is at the moment more inquiry from railroads for material for track elevations and bridges for the elimination of grade crossings than in the building trade. The popular demand for the elimination of grade crossings is increasing and promises to develop a permanent increase in the demand for bridge material. It is estimated that about 10 per cent of the business in the building field bid upon has been either postponed or abandoned. The American Bridge Co. secured an order from the Southern railroad for 1,400 tons of steel for new shops and one for 1,200 tons of bridge material from the Lake Erie & Western. The Passaic Steel Co. was awarded the contract for the Evening Post Building and the McClintic-Marshall Construction Co., one for 2,000 tons of bridge work for the Buffalo, Rochester & Pittsburg. Many of the railroads are negotiating for material for small bridges, the total being in excess of 30,000 tons. This is in addition to the immense tonnage for office building and industrial plants yet to be placed. The sales of rails have not been as heavy as last week, but considering the difficulty of securing delivery from any of the mills during the present year the total is not small. Plates are in fair demand and an occasional premium over the official price is still secured on odd lots. The launch of the Hendrik Hudson, the new 400-foot river steamer, last week was witnessed by representatives of the Lukens Iron & Steel Co. with peculiar interest, for all the plates in the hull of the vessel were supplied by the mills of that company. The following are prices at tidewater:

Angles, 3 to 6 inches x ¼ inch and heavier, 1.84½c; beams, 3 to 15 inches, 1.84¼c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.74½c; flange, 1.84½c; marine boiler, 2.41½c; refined iron bars, 1.69½c to 1.74½c; soft steel bars, 1.64½c; sheets, No. 28 black, 2.40c.

Old Materials.—The market continues very dull, neither buyers nor sellers showing any interest. The coal strike seems to have had a disastrous effect. There is a lull in the demand for steel scrap, but consumption is reported to be very heavy and business is expected to return as soon as conditions become more settled. Two lots of car wheels amounting to about 800 tons are held for purchasers at Jersey City, but no buyers have appeared. The following are prices approximately f. o. b. tidewater:

Old iron rails	$21.00 to 22.00
Old steel rails, long lengths	14.50 to 15.00
Old steel rails, short pieces	14.25 to 14.50
Relaying rails	23.00 to 24.00
Old car wheels	18.00 to 19.00
Old iron car axles	24.00 to 25.00
Old steel car axles	19.00 to 19.50
Heavy melting steel scrap	14.25 to 14.50
No. 1 railroad wrought scrap	17.00 to 18.00
Iron track scrap	16.50 to 17.00
Wrought pipe	12.00 to 13.00
Cast borings	9.50 to 10.00
Wrought turnings	13.50 to 14.00

BIRMINGHAM.

Improved Tone of the Market.—Meeting of the Tennessee Coal, Iron & R. R. Co.

April 2.

A better feeling prevails in the southern pig iron market as the demand improves; inquiry becomes very active and prices stiffen a little. The statement is made authoritatively that some sales for delivery during the third quarter of the year have been made and that an inquiry has been received already which would indicate that considerable business is likely to be placed in this section. The coal strike in the north and west does not alarm the iron men of this section much, when questioned the iron men stating that they do not believe that a general strike will be conducted and that there can be no harm done except to the country at large and then Alabama would have to contribute her share.

The feature of the week just past was the meeting of the board of directors of the Tennessee Coal, Iron & Railroad Co., which was attended by Don H. Bacon, chairman, John W. Gates, L. C. Hanna,

E. W. Oglebay, S. G. Cooper and Grant Schley. After the meeting was over the following official statement was given out:

"At a meeting of the board of director of the Tennessee Coal, Iron & Railroad Co., Mr. John A. Topping was elected a director and made chairman of the board; but this change in the board of directors does not involve any changes in the organization. The board declared its regular quarterly dividend of 1 per cent on the common stock and its quarterly dividend of 2 per cent on its preferred.

"No action was taken in the matter of extensions or new improvements at this meeting, but it was determined to thoroughly remodel the steel plant and blast furnaces so as to bring them up to the highest state of efficiency. This work will necessarily involve the expenditure of large sums of money and will materially increase the output of the Tennessee Coal, Iron & Railroad Co. in its various finishing departments. General improvements will also be made in the coal mining department of the company by additional equipment necessary to secure a greater output in coal and coke, as well as to improve the quality."

Following this announcement the statement was made authoritatively that Mr. Don H. Bacon, president of the Tennessee Coal, Iron & Railroad Co. had announced his intentions of not standing for re-election at the meeting of the directors to be held May 15 and on that date he will sever his connection with the company.

While no definite information is given out, it is understood that the steel plant at Ensley will be enlarged, practically doubled, several blast iron furnaces will be practically rebuilt, mines will be furnished with modern equipment and other work done immediately. Several hundred thousand dollars will be expended on the steel plant and furnaces, while half a million dollars will be spent in and around the coal and ore mines in the district. Within the next two or three years the Tennessee Coal, Iron & Railroad Co. will spend between five and ten million dollars in Alabama, it is expected. One of the directors is quoted as saying that he thought well of the Alabama properties and that he had made up his mind to hold to his interests in the Tennessee Coal, Iron & Railroad Co.

Who will succeed Mr. Bacon as president of the T. C. I. & R. R. Co. is not known, but it is not improbable that it will be Mr. Topping, though there is some talk of a steel expert being selected for the position. Mr. Topping announced after the meeting that he will spend considerable time in Alabama in the future. He will probably be here one-third of his whole time. Some of the directors are of the opinion that his duties with the Republic will not allow him to accept the presidency of the Tennessee company.

Metal Market

NEW YORK.

April 2, 1906.

Pig Tin.—The market is firm with prices further advanced. According to statistics compiled by C. Mayer, secretary of the New York Metal Exchange, the total visible supply of tin on March 31, 1906, was 2,744 tons below that on March 31, 1905. The arrivals at Atlantic ports for the month equaled 2,083 tons; afloat at the end of the month, 3,611 tons. The following are today's quotations: Spot, 37⅜ to 37⅝; April, 37.15 to 37.35; May, 36¾ to 37¼; London, £169 15s and £166 17s 6d.

Copper.—The market is firm; domestic consumers have bought liberally. Today's quotations follow: Lake, 18½ to 18¾; electrolytic, 18¼ to 18½; casting 18 to 18¼; London's closing today: £84 5s and £81 15s. Exports for March, 16,013 tons.

Lead.—The market for grades of refined lead remains unchanged. Today's closings, 5.35 to 5.45; St. Louis, 5.27½; London, £15 18s 9d.

Spelter.—The demand has been light and the market easy in tone. Today's closings, 6.12½ to 6.20; St. Louis, 6.00 to 6.02½; London, £25 2s 6d.

Antimony.—The market is strong and prices have again advanced. Today's quotations, Cookson's and Hallett's, 17½ to 18; other grades, 17 to 17½.

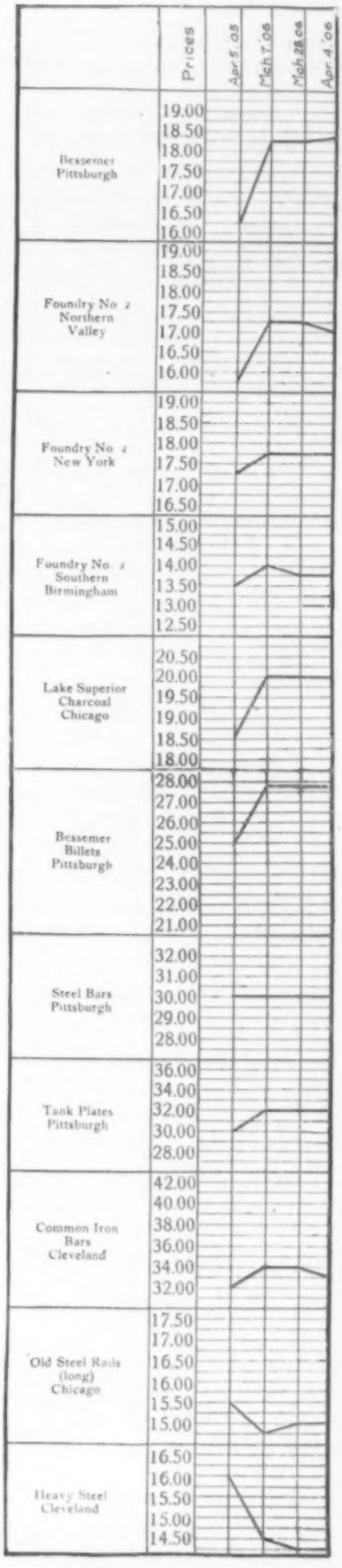
CHICAGO.

April 3.

Metals continue to improve. The demand for copper is brisk and prices are stronger. Tin is also firmer and susceptible to advances. Spelter is scarce and quotations are steady. Lead is also in good demand, but shows no noticeable change in price. Lake copper is quoted 18½c to 19c; casting copper, 18¼c to 18¾c; pig tin, 37½c to 38c; in small lots ½c higher; spelter, prompt delivery, 6⅜c to 6⅝c for car lots; pig lead, 5.30c delivered in 50-ton lots, desilverized; corroding, 6.00c to 6.25c for 50-ton lots; sheet zinc, $7.75 list, f. o. b. LaSalle in car lots of 600-lb. casks. Antimony, 16½c to 17c for Hallett's and 16¾c to 17c for Cookson's.

The American Pig Iron Storage Warrant Co. reports for March as follows: Stocks on hands Feb. 28, 35,300 tons; receipts, 1,600 tons; deliveries, 6,400 tons; balance on hand March 31, 30,500 tons.

PRICE CHART.



THE IRON TRADE REVIEW

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April 5, 1906.

INCREASED SHEET AND TIN MILL OUTPUTS.

The sheet and tin plate output of the United States Steel Corporation in 1905 was not, as some early and apparently authentic statements had it, considerably in excess of a million gross tons, the annual report now giving the total at 924,439 gross tons. This production was, however, far in excess of the output in previous years, being 21 per cent more than the former record, made in 1902. The corporation's output of sheet and tin mill products has been as follows:

Year.	Gross tons.
1902	699,621
1903	763,670
1904	735,482
1905	924,439

This large increase, amounting in three years to 32.1 per cent, has been accomplished with substantially no increase in the number of operative mills. The total number of sheet and tin plate mills owned by the steel corporation has indeed been a diminishing quantity, through dismantlement. No purchases of outside plants have been made which contributed to the 1905 production, with the exception of the Sharon properties, and of these the sheet mill was not an important factor. The average number of sheet and tin plate mills actually operated was about the same in 1905 as in 1902 and 1903.

Substantially the whole gain has been through increased output per mill per week. This result has been achieved partly by improvements to plant, but chiefly through pushing the rolling operation. While the artificial output limit of the Amalgamated Association was abolished only July 1 of last year, there has been no output limit in the non-union mills, and the number of non-union mills has been an increasing quantity. Furthermore, the Amalgamated Association limit was more and more generally violated, up to its complete abrogation.

Ten years ago the Amalgamated limit in tin mills was 5,250 pounds per turn, and an actual output averaging 4,500 pounds per turn was considered a fairly good achievement. When the scale came up for adjustment in the summer of 1896 the manufacturers desired an increase in the limit, but that it was not so easy to exceed the limit, on an average, is shown by the fact that they accepted, as a concession worth while, the new provision that turns below the limit could be made up, during the same week, to the extent of 500 pounds per turn. There were subsequently two increases in the limit, so that when it was abolished it stood at 6,250 pounds per turn.

It is now common and regular practice in some mills, when working on 30 gauge, to make as much as 10,000 pounds in a turn, or more than 50 per cent in excess of the limit as it last stood. Even on 31 gauge as much as 9,000 pounds per turn has been made over long periods.

In the sheet branch the increase has not been so marked, but has still been quite important. More than ten years ago the limit was increased from seven to nine heats per turn, while effective January 1, 1904, the limit was increased to 10 heats. In the non-union mills more heats per turn have been rolled, and the number of pairs per heat has been larger, frequently, than in Amalgamated practice.

The workmen used to maintain strenuously that pushing the output beyond proper limits was an important cause of roll breakage, and some mill managers were disposed to hold to the same theory. It is now well established that if pushing the output has any tendency at all to break rolls, the loss from this cause is quite unimportant in comparison with the advantage of the increased output. At one tin mill, where the output averages in excess of 9,000 pounds per turn, even on 31 gauge, the records show an average breakage and an average life for the rolls which wear out such that the loss of rolls from breakage is less than the loss from wearing out, while the rolls which break are as likely to be old as new rolls, and therefore have an average life something like half as long as those which wear out. The total cost of roll breakage at this plant, therefore, is considerably less than the cost of replacement of worn out rolls, except for the time lost, and the cost is therefore much less than the advantage through the increased output.

Statistics of production of sheets and tin plates by independent interests are not gathered separately. It is a fact, however, that the independent production, proportioned to the production of the steel corporation, has shown a large increase in the past few years, and even since 1902. While the corporation's production increased from 1902 to 1905 by 32 per cent, the independent production, therefore, increased by a larger percentage, and the country's total production has accordingly increased by more than 32 per cent. The total in 1905 was probably in the neighborhood of 1,300,000 gross tons.

The sheet and tin plate industry now fairly takes rank among the large tonnage producers, the list of which will be made up of rails, exceeding 3,000,000 tons per year, and plates, wire, pipe and merchant mill products, each lying between 1,000,000 and 2,000,000 tons per year. Indeed, the production of sheet and plate material thinner than quarter-inch is not very far under the tonnage of that size and heavier. The great increase in the use of plates for steel cars and for structural work has been more or less balanced by the growth of electrical sheet production and by the production of sheets and tin plates for a wide variety of new uses, the old uses having, of course, shown their own increase.

CHANGES IN THE A. S. M. E.

The Council of the American Society of Mechanical Engineers has made public the following letter received from Prof. F. R. Hutton, who has been secretary of the society since

1883, in which he makes known to them his desire to withdraw from the active work connected with that position:

New York, Jan. 29, 1906.

To the Council of the American Society of Mechanical Engineers:

Gentlemen:—It may be known to some members of the Council that for several years I have had the thought in mind of resigning the secretaryship of the society, on the completion of twenty-five years of service. I was first elected in March, 1883. My more recent thought has been that instead of waiting for a merely sentimental period to elapse, which would have meaning to myself alone, I might rather emphasize the more obvious culmination of my service to the society by withdrawing at the time when the society shall cross the threshold of its new home in the engineering building. It will then have been given to me to have wrought for the society from the days of small beginnings, when I paid my own office rent and expenses, through the period of rented offices, and of the ownership of the modest home in Thirty-first street and up to the opening of the days of larger opportunity in the splendid surroundings of the new enterprise. It is wise, I am sure, that at the time of this external change the society should also make the internal change incident to securing as its secretary one who will and can devote his entire time to the work and development of the society.

It is well known to you that I have felt that I must owe and pay my first allegiance to the work of my professorship in Columbia University.

This being the case, the council should be advised far enough in advance, so that the least embarrassment may be entailed by my withdrawal. I have, therefore, thought it best to present this formal letter at the first meeing of the year, and to ask by it that proper action may be taken looking to the question for the future which it raises. I ask that I may be relieved of the duties of the secretaryship at the end of the current society year, or at such other time thereafter as the council may see fit to have this resignation take effect.

It would be my wish and preference that no unnecessary or premature publicity be given to the fact of my decision. I seek to avoid having anything like a "fuss" made.

(Signed) F. R. Hutton,
Secretary.

Prof. Hutton's position as head of the department of mechanical engineering of Columbia University entails so much work that he has found it increasingly difficult to continue to bear in connection with it the heavy burden imposed in the proper conduct of the office of secretary of such an organization as the American Society of Mechanical Engineers.

In view of the splendid work that has been performed by Prof. Hutton in the past, the council of the society is adverse to entirely losing his services, and the accompanying letter was withheld until there had been opportunity for conference with an idea of retaining Prof. Hutton's services for the conduct of meetings, and the carrying on of other duties, for which he is so well qualified, but which will not impose any great burden upon him. In connection with this idea, it has been proposed to obtain another man to supervise the detailed work of secretary, and to act as business manager of the society. This man is to have the title of secretary, while Prof. Hutton will be granted the title of honorary secretary, or something similar.

Prof. Hutton's work during the past twenty-three years, has been of the highest order, and members of the society owe him a debt of gratitude, for it is in no small measure due to him that the organization holds today the high place which it has attained among engineering societies of the world. While it is to be regretted, perhaps, that Prof. Hutton feels that he could not round out a full quarter century of service, he has chosen an opportune time to relinquish the burden when the society enters its new home in the engineering building.

THE BUREAU OF STANDARDS AND THE METRIC SYSTEM.

The recrudesence of the agitation for the compulsory adoption of the metric system by departments of the United States government, and the introduction of the Littauer bill, providing for such compulsory adoption, bring to light some evidences of abuse of official positions. The director of the national bureau of standards is one of the most active advocates of the adoption of the Littauer bill, has appeared before the committee of the house on weights and measures, and has presented arguments in favor of its adoption, has conducted cross examinations of opponents of the bill, and has brought contractors endeavoring to sell supplies to the bureau of standards before the committee to testify in favor of the system. The director and his subordinates have lectured in various portions of the country, and have endeavored to stir up sentiment in favor of the metric system.

In addition to this, the bureau of standards has made the statement publicly that the metric units are the fundamental units of weights and measures of the United States, and has caused this statement to be scattered broadcast, substantiating this assertion by some ingenious juggling of the English language.

This seems to us to be a very decided abuse of the position of the director of the bureau of standards. The constitution of the United States expressly states that "congress shall have the power to fix the standard of weights and measures." When congress established the bureau of standards, it did not delegate any portion of this power to that bureau. The latter's functions were restricted to "the custody, comparison, construction and testing of standards, the solution of problems in connection with standards, and the determination of physical constants." The bureau of standards is going beyond its powers when it fixes a meter as a fundamental unit of length for United States standards. In another column of this issue, we present some of the director's testimony before the committee on coinage, weights and measures of the house of representatives, together with comments tending to show their fallacy. It strikes us that the director could employ his time more profitably in attending to the duties of his office rather than lobbying in congress.

The entire agitation for the metric system, at this time, is unfortunate. It has been demonstrated time and again that the expense to the manufacturers of this country, and particularly to those engaged in the machinery and metal trades, of changing from the English to the metric system, would be enormous, not to say prohibitive, and without any compensating advantages. The arguments advanced by the advocates of the

metric system have been the same for the past thirty years, and no new ones have been presented in that time. The arguments against it are multiplying daily, and the manufacturers of the country should wake up to the danger to their interests in this constant presentation of bills compelling the adoption of the metric system. A number of societies have recorded themselves as opposed to it. Among these, may be mentioned the National Metal Trades Association, which, at its convention in Cleveland, a few weeks ago, unanimously adopted a resolution urging the defeat of the Littauer bill; and the American Society of Mechanical Engineers, two years ago, by means of a letter ballot showed itself as overwhelmingly opposed to the metric system. The manufacturers of this country should use all their influence with their congressmen to bring about the defeat of this bill, if it is ever favorably reported out of committee.

BLOW TO THE "CLOSED SHOP."

Justice Nicholls of the Supreme Court of Kentucky recently handed down a decision which seriously affects employes in shops where only union men are employed. The decision rules that if an employe of a "closed shop" sustains personal injuries through the negligence or inability of a fellow employe, he can not recover damage from his employer. Under the common law a workman so injured could recover if it could be shown that the employer had failed to provide competent fellow servants, or a number sufficient for the task undertaken, but this decision holds that under the closed shop rule the unions have taken upon themselves the responsibility of determining who shall or shall not be competent and the employer is thereby released from liability for the acts of incompetency resulting in personal injuries to other employes.

Schwab's Opinion: Charles M. Schwab is quoted as follows on present iron and steel conditions: "There seems to be no basis for the recent pessimistic reports bearing on the iron and steel industry. It is true that there has been a slight falling off from the enormous volume of business that was flowing into the mills some time ago, but I have not heard of any shrinkage in unfilled business. I know that this is not the case with the Bethlehem Steel Co. As a matter of fact, steel conditions could hardly be better, and it looks like a continued run of prosperity for months, with natural recessions."

The Domhoff & Joyce Co., Cincinnati, is remodeling its offices and has added another room to its space.

The Acme Machinery Co., Cleveland, O., has begun the construction of a new crane shop, 80 x 160 feet. The Hunkin Bros. Construction Co. is doing the work. All necessary equipment has been purchased.

The Canadian Westinghouse Co., according to the annual report just made public for the year ending Dec. 31, last, showed net earnings of $220,545; dividends were $149,100 and the surplus Dec. 31 was $232,041. Assets of the company are given as $3,382,255 as against $2,926,724 the year previous.

SAMUEL L. MOYER,
Recently elected president American Supply and Machinery Manufacturers' Association.

The income account of the Colorado Fuel & Iron Co. for the eight months ending with February shows:

Gross earnings	$14,470,688
Operating exp	12,734,841
Net	1,735,847
Other income	321,029
Total	2,056,876
Fixed charges	810,821
Surplus	1,246,055
Deduct for rentals, excess cost of Lake Sup. ore etc.	1,021,554
Surplus	$224,501

The Colonial Steel Co., Pittsburg, has added another 24-pot crucible melting furnace to its plant at Colona, Pa. The new open-hearth furnaces will be ready about June 15.

AMERICAN RAILS

Ordered for Canadian Railway and Removal of Tariff is Advocated.

Toronto, Canada, April 4.—Owing to the inability of the Canadian steel rail mills to supply steel rails in sufficient quantity to meet the present extraordinary demand, the Grand Trunk Pacific Railroad has placed an order for 50,000 tons of steel rails in the United States, through the United States Steel Products Export Co. While the Dominion Iron & Steel Co. is turning out from 500 to 800 tons daily on a contract for the Canadian Pacific Railway and the Consolidated Lake Superior Corporation's Sault Ste. Marie mill is producing on an average 600 tons per day, the output is inadequate and no new orders for immediate delivery can be filled. It is anticipated that other Canadian contracts may go to American manufacturers. The Grand Trunk Pacific is asking the Canadian government to allow the American rails to come in free of duty on the ground that the duty was not imposed for revenue but strictly for protective purposes, and that as the Canadian mills cannot supply its requirements, they are entitled to its remission.

WILLARD PARKER,
Recently elected third vice president American Supply and Machinery Manufacturers' Association.

The annual meeting of the stockholders of the United States Steel Corporation will be held in Hoboken, April 16. The directors whose terms expire this year are: William Edenborn, Henry C. Frick, William H. Moore, Norman B. Ream, James H. Reed, Charles Steele, Peter A. B. Widener and Robert Winsor.

RECORD BREAKING

Year in Tonnage and Earnings on the Bessemer & Lake Erie Railroad.

The annual report of the Bessemer & Lake Erie railroad, for the year ending December 31, 1905 has been made public and shows that from a tonnage and earnings standpoint the operations of the road were the most successful in its history. The net earnings were $626,061.97 in excess of 1904 while the tonnage for the year shows an increase of 2,298,010 net tons, of which increase 1,242,072 were ore and 689,242 tons were coal, the coal tonnage for the year having passed the 2,000,000 ton mark, and the total tonnage of the road being nearly 10,000 tons.

For the year ending with this report the total net tons of freight carried earning revenue was 9,505,439, of which 5,820,268 net tons were ore and 2,171,019 were coal. The summary of tonnage handled per annum, 1897 to 1905 inclusive, is as follows:

	Ore (Gross tons.)	(Net tons.)	Other Freight (Net tons.)	Total (Net tons.)
1897	446,810	500,428	650,928	1,151,356
1898	1,477,768	1,655,101	812,273	2,467,374
1899	2,176,525	2,437,708	1,054,455	3,492,163
1900	2,396,474	2,684,051	1,496,340	4,180,391
1901	3,233,962	3,622,038	1,803,316	5,425,354
1902	4,183,868	4,685,933	1,993,435	6,679,368
1903	3,909,982	4,379,180	2,507,317	6,886,497
1904	4,087,675	4,578,196	2,629,233	7,207,429
1905	5,146,668	5,820,268	3,685,171	9,505,439

The net earnings from operations in 1905 were $2,758,594.63 and in 1904, $2,132,532.66, an increase for the past year of $626,061.95, while the operating cost (ratio) for 1905 was 48.99 per cent as against 50.14 per cent in 1904, a decrease of 0.15 per cent in favor of 1905.

This company is now confronted with the condition that for a single track road with a tonnage of 10,000,000 tons, the limit for economical operation is about reached, as the number of trains required, over a single track, overtaxes its capacity. In 1905 the mileage was increased 23 8-10 miles of which 18¼ miles was new second track and the balance sidings. During the coming year 19 1-5 miles of track will be added so that by the end of 1906 practically one-half the line will be double tracked. During 1905, 25,000 steel ties and fastenings were purchased, a majority of which were placed in the track during the year. For the new work authorized for 1906 and for maintenance, 80,000 additional steel ties have been purchased, in all 105,000, sufficient for 42 miles of track.

The foundry of Taylor & Boggis and the H. C. Tack Factory, Cleveland, O., were damaged to the extent of $20,000 by fire on March 31.

AMERICAN CAN REPORT.

The American Can Co. has filed with the secretary of state of Massachusetts a report of its financial condition to Dec. 31, 1905. Handsome increases are shown. The report follows:

	Dec. 31, '05.	Mar. 31, '05.
ASSETS.		
Plants	$78,879,640	$78,258,453
Material	4,285,389	6,268,876
Cash, etc.	4,585,476	2,648,462
Total	$87,750,506	$87,175,792
LIABILITIES.		
Capital	$82,466,600	$82,466,600
Accounts	721,478	911,932
Surplus	4,047,012	3,281,843
Div. Jan. 1	515,416	515,416
Total	$87,750,506	$87,175,792

METAL TRADES ASSOCIATION NOTES.

The president of the National Metal Trades Association, Mr. W. D. Sayle, in accordance with a resolution passed at the last convention, appointed the following committee to oppose the metric system: W. D. Cowles, of the Long Arm System Co., of Cleveland; Wm. Lodge, of the Lodge & Shipley Co., Cincinnati; Chas. Gingrich, of the Cincinnati Milling Machine Co., Cincinnati; Wilfred Lewis, of the Tabor Manufacturing Co., Philadelphia, and J. H. Barr, of the Smith-Premier Typewriter Co., of Syracuse, N. Y. The committee started for Washington on Wednesday, April 4, to appear before the committee on coinage, weights and measures, which is considering the Littauer bill.

The buffers and polishers in the employ of the National Sweeper Co., of Marion, Ind., went on strike, March 27. By a singular coincidence the plant was burned down on Sunday, April 1.

All the tool makers, fifteen in number, in the employ of the Consolidated Manufacturing Co., of Toledo, Ohio, after making an unreasonable demand, for higher wages last Saturday afternoon, failed to report for work Monday morning.

Robert Wuest, acting commissioner of the N. M. T. A., accompanied by the assistant secretary, J. H. Cone, spent Tuesday, March 27, in Toledo, Ohio, organizing a local branch of the N. M. T. A.

COMPTROLLER BOWER.

Milwaukee, Wis., April 4.—L. F. Bower, who succeeds J. A. Milne as comptroller of the Allis-Chalmers Co., of Milwaukee, is a man whose mental make-up and character are indicated by the fact that he quite recently passed the bar examination, despite the many other duties devolving upon him, and making spare moments few.

Mr. Bower was born in New Berwick, Pa., graduating at Wesleyan University, Middletown, Pa., in 1879. He was for five years in the treasurer's office of the Jackson & Woodin Mfg. Co., Berwick, Pa., intimately associated with the persons now in control of the American Car & Foundry Co., and later he spent three years in Carlisle, Pa., as principal of the preparatory department of Dickinson college. For six years he was manager and treasurer of the Carlisle Mfg. Co. and from 1896 to 1901 secretary and treasurer of the Dickinson Mfg. Co. On April 1, 1904, he went to Cincinnati as secretary and treasurer of the Bullock Electric Mfg. Co., and in 1905 was appointed manager of that plant. He was admitted to the bar in Pennsylvania.

L. F. BOWER.

Formal announcement has finally been made admitting the purchase by the Westinghouse Electric & Mfg. Co., of the plant of the National Electric Co., in Milwaukee. The plant will be continued for the manufacture of electric machinery and the Christensen air-brake. H. H. Westinghouse of Pittsburg and a number of other Westinghouse officials, spent several days of last week inspecting the Milwaukee plant, and other representatives all now taking stock at the works.

HEARTY WELCOME

Extended Visitors by Pittsburg Foundrymen.—The Cleveland Convention's Prospects.

The Pittsburg Foundrymen's Association did itself proud on Monday of the present week when, instead of holding the regular monthly meeting, it entertained the foundrymen of Philadelphia, Cleveland, Erie and New England, first by conducting them through several of the large foundry and manufacturing plants of Greater Pittsburg, the Westinghouse plants at Trafford City, the great steel works of the Carnegie Steel Co., at Homestead, and the Carnegie Technical Schools, and in the evening by giving them a banquet at the Colonial Annex Hotel.

The proverbial Pittsburg weather did not make an appearance and everything in connection with the entertainment went through without a hitch. Truly, the workshop of the world opened wide its doors and the Pittsburg foundrymen received the visitors with open arms.

At the banquet in the evening, President B. D. Fuller, of the Pittsburg association did the honors as toastmaster and with J. W. Wardrop, of the Merchants' and Manufacturers' Association, greeted the visitors. They decided that despite its dirt and smoke the city was the workshop of the world which assertion could be backed up with facts, and that under the pall from smokestacks and dust of furnaces the heart of the people were as warm, and they were as willing to extend the good hand of fellowship, as any in the city on the globe, Thos. D. West, president of the National Foundrymen's Association, spoke on the coming national convention to be held at Cleveland in June. He said that while the association had already done great work, there was still much to do and that this required the cooperation of every foundryman in the country, that all must help and not as in the past let the work be one of patriotism when the burden fell upon a few. He explained that the Cleveland convention would excell any previous convention of the association and would provide unusual entertainment features, aside from offering an exposition by the foundry supply houses of the country.

E. H. Mumford, of Philadelphia, responded to the address of welcome in behalf of his Philadelphia associates and extended their hearty appreciation of the courteous entertainment provided by the Pittsburgers. B. M. Shaw, of Boston, responded in behalf of the New England delegation, and said that in that part of the country the impression prevailed that all Pittsburgers were millionaires and he was ready to believe it after the manner in which he had been entertained. W. B. Greene and H. M. Lane, of Cleveland, responded for that city, Mr. Lane talking upon the coming convention and making a plea for co-operation and a full attendance.

Prof. C. B. Connelley, of the Carnegie Technical School, spoke in appreciation of the assistance given the schools by the foundrymen and asked that they impress upon their young men the necessity of taking up a technical course. He said the good which has been done will be shown by the product turned out at the completion of the course.

Dr. R. Moldenke took up the educational side of the association's work, urged that those not already members be gathered into the fold and spoke of the recognition given the national association by the government in adopting standards for chemical analyses and the appointment of the association secretary as a member of a committee in connection with the United States Geological Survey.

Those in Attendance.

E. E. Brown, E. E. Brown & Co., Philadelphia.
Clarence P. Franklin, E. E. Brown & Co., Philadelphia.
U. E. Kranavel, Interstate Sand Co., Cleveland.
E. H. Mumford, The E. H. Mumford Co., Philadelphia.
Wm. F. Grunau, Erie City Iron Works, Erie, Pa.
P. S. Crawford, U. S. Graphite Co., Saginaw, Mich.
Ralph H. West, Vandergrift, Pa.
J. F. Johnston, Braddock Machine & Mfg. Co., Braddock, Pa.
Wm. J. Sherman, Bethlehem Steel Co., South Bethlehem, Pa.
C. O. D. Blanchfield, *American Manufacturer and Iron World*, San Francisco.
W. L. Wright, Bethlehem Steel Co., South Bethlehem, Pa.
W. B. Kennech, Bethlehem Steel Co., Philadelphia, Pa.
Geo. R. Sullivan, Rogers, Brown & Co., Philadelphia.
Jas. R. Darragh, Rogers, Brown & Co., Pittsburg.
Walter S. Bickley, Penn Steel Casting & Mach. Co., Chester, Pa.
Phillip C. Smith, Ingersoll-Rand Co., Phillipsburg, N. J.
F. Cooper Pullman, J. Wesley Pullman, Philadelphia.
Howard C. Matlack, Frank Samuel, Philadelphia.
Thomas G. Smith, Midvale Steel Co., Philadelphia, Pa.
Harry A. Grusch, United Engineering & Fdy. Co., Pittsburg.
G. W. Knotts, Frank-Knell Mach. Co., Pittsburg.
Chas. G. Smith, Chas. G. Smith Co., Pittsburg.
J. Francis Weisbrod, Penna. Casting & Machine Co., Allegheny.
A. N. Bates, Erie Foundry Co., Erie, Pa.
W. Earle Mark, Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Otto W. Schaum, & Uhliger, Philadelphia.
Cyrus Borgner, Philadelphia.
Thos. Evans, The Eynon-Evans Mfg. Co., Philadelphia.
Chas. C. Bacon, Ross-Tacony Crucible Co., Philadelphia.
Richard H. Day, Day Bros., Philadelphia.
Chas. R. Day, Midvale Steel Co., Philadelphia, Pa.
Chas. J. Caley, Russell & Erwin Mfg. Co., New Britain, Ct.
F. B. Harkins, F. B. Harkins Foundry Co., Bristol, Pa.
Harwood Wilson, Rogers, Brown & Co., Cleveland, O.
Ely Griswold, Erie City Iron Works, Erie, Pa.
J. S. Smith, The J. D. Smith Foundry Supply Co., Cleveland.
James A. Brown, Frankford Arsenal, Philadelphia.
Harry D. Harvey, Monarch Engineering & Mfg. Co., Baltimore, Md.
Frank Krug, Joseph Dixon Crucible Co., Philadelphia.
George G. Walker, Erie Railroad, Pittsburg.
Wm. J. Brant, The Millers Products Co.
C. E. Bell, The C. E. Bell Co., Hillsboro, O.
Philip Frankel, Sec'y. Cleveland Foundrymen's Ass'n., Cleveland.
W. B. Greene, The Palmer & DeMooy Fdy. Co., Cleveland.
Wm. Greenbaum, Acme Foundry Co., Cleveland.
Thos. D. West, Sharpsville, Pa.
E. E. Durant, G. F. Warner Mfg. Co., New Haven, Ct.
H. M. Lane, Editor, *The Foundry*, Cleveland.
John T. Wilkin, Connersville Blower Co., Connersville, Ind.
Dr. R. Moldenke, Watchung, N. J.
Wm. J. Breen, Hugh W. Adams & Son, Boston, Mass.
John S. McCormick, J. S. McCormick Co., Pittsburg.
F. H. Zimmers, Union Fdy. & Machine Co., Pittsburg.
Benjamin Holt, Camden Foundry Co., Camden, N. J.
Bartlett M. Shaw, Walker & Pratt Mfg. Co., Boston, Mass.
E. M. Ayers, The Ayers Mineral Co., Zanesville, Ohio.
G. C. Schade, Fort Pitt Bridge Works, Canonburg, Pa.
Edw. Miller, Fort Pitt Bridge Works, Canonburg, Pa.
H. C. Koontz, Interstate Sand Co., Cleveland.
Howard Evans, J. W. Parson Co., Philadelphia.
Wilmer Krusen, E. E. Brown & Co., Philadelphia.
Louis J. McGrath, Thomas Devlin Mfg. Co., Philadelphia.
Paul Kreuzpointner, Altoona, Pa.
H. G. Davies, The Interstate Sand Co., Cleveland.
James A. Murphy, The Interstate Foundry Co., Cleveland.
Eliot A. Kebler, Matthew Addy & Co., Pittsburg.
C. B. Connelley, Carnegie Technical School, Pittsburg.
William H. Colcord, Clinton Iron & Steel Co., Pittsburg.
William Stark, A. Garrison Fdy. Co., Pittsburg.
Henry McEwan, Garrison Foundry Co., Pittsburg.
E. D. Frohman, S. Obermayer Co., Pittsburg.
Paul L. Hay, Whiting Foundry Equipment Co., Pittsburg.
S. A. McRoberts, American Manufacturer, Pittsburg.
L. L. Carson, American Manufacturer, Pittsburg.
C. M. Goldman, S. Obermayer Co., Pittsburg.
B. D. Fuller, Westinghouse Electric & Mfg. Co., Pittsburg.
Jas. W. Wardrop, Merchants & Manufacturers Ass'n., Pittsburg.
Geo. W. Baum, Mackintosh-Hempfiill & Co., Pittsburg.
W. H. McFadden, Mackintosh-Hempill & Co., Pittsburg.
Charles Johns, Seaman, Sleeth & Co., Pittsburg.
Robert A. Walker, *Iron Age*, Pittsburg.
J. Franklin Thomas, National Car Wheel Co., Pittsburg.
C. B. Murray, Metallurgical Laboratory, Pittsburg.
A. C. Daft, Hickman, Williams & Co., Pittsburg.
James Keegan, United Engineering & Fdy. Co., Pittsburg.
W. B. Robinson, IRON TRADE REVIEW, Pittsburg.
G. J. Thomas, Sterrit-Thomas Foundry Co., Pittsburg.
Thos. A. Wilson, Rogers, Brown & Co., Pittsburg.
B. H. Prack, Westinghouse Electric & Mfg. Co., Pittsburg.
Wensel Vewerka, Westinghouse Electric & Mfg. Co., Pittsburg.
Stuart B. Marshall, L. & R. Wister & Co., Pittsburg.
G. H. Armstrong, Matthew Addy & Co., Pittsburg.
Henry P. Spilker, Sterrit-Thomas Foundry Co., Pittsburg.
Jos. S. McDonald, Westinghouse Electric & Mfg. Co., Pittsburg.
A. R. Golden, Pressed Steel Car Co., Pittsburg.
John D. Frasher, Pressed Steel Car Co., Pittsburg.
E. F. Bill, Pressed Steel Car Co., Pittsburg.
J. H. Sleeth, Westinghouse Air Brake Co., Wilmerding, Pa.
S. D. Sleeth, Westinghouse Air Brake Co., Wilmerding, Pa.

Richard Muse, Marshall Fdy. Co., Pittsburg.
Thomas Ward, Pittsburg Brass Mfg. Co., Pittsburg.
J. W. Lowry, Westinghouse Air Brake Co., Wilmerding, Pa.
J. D. Harris, Westinghouse Air Brake Co., Wilmerding, Pa.
John A. Mieghan, John A. Mieghan Co., Pittsburg.
W. S. Bumbaugh, Monessen Fdy. & Mach. Co., Monessen, Pa.
D. L. Evnon, Seaman-Sleeth Co., Pittsburg.
H. E. Field, Mackintosh-Hempill & Co., Pittsburg.
August A. Miller, *Iron Age*, Philadelphia.

FAREWELL DINNER TO D. M. FORKER.

On Saturday evening, March 31, the pig iron firms of Cincinnati tendered a farewell dinner to Mr. D. M. Forker, of the Republic Iron & Steel Co., on the occasion of his leaving Cincinnati to assume more responsible duties with the company in the general offices at Pittsburg. The dinner was given at the St. Nicholas Hotel and the menu was elaborate. The committee on arrangements was highly complimented on the completeness of its efforts and everything possible was done to provide for the comfort and convenience of those present.

The affair was unique in the fact that it was the first occasion of the kind within the remembrance of any of those present. The spirit of goodfellowship, which was so evident, resulted in the appointment of a committee to arrange for dinners at regular intervals, it being understood that Mr. Forker, the guest of honor, should always be honored with an invitation.

Mr. Robert Field, of the Robert Field Sales Agency presided as toastmaster in a most graceful and entertaining manner.

Mr. C. H. Jenkins, of the Domhoff & Joyce Co., read an original poem, which is herewith presented:

Who's Who Tonight.

Who's here tonight—let's call the roll
And scan these faces o'er.
More jolly crowd round festal board
Was sure ne'er seen before.

The guest of honor, first, of course—
He's popular with all;
His hosts of friends here, wish him well.
Good fortune to him fall.
We'll surely miss him when he's gone,
But e'en tho from us far
We'll ne'er forget that smiling face
F-O-R-K-E-R.

And there's *McKee* and *Knight* as well
They're sorry, too, I guess,
To know their gallant chief must leave
Republic I. & S.
But some of us have got to stay,
And while the parting's sad.
With other friends to cheer us up
Old Cincy ain't so bad.

Two other friends are welcome guests
Each like to us a brother.
We all know *Morten* is the one
And *Lindsley* is the other.
They come to see us every week
The latest news to get.
They put it to the public straight;
What they say goes, you *bet*.

Toastmaster *Field*—you know him well;
A jolly fellow he;
Who always likes to treat his friends
To sandwiches—and "tea."
The boys all like to have him round
When any fun's on hand,
He's sure to keep things going some,
He's equal to a band.

James Albert Green—familiar name—
We know it well by heart;
Not only in a business way
But science, books and art.
He also lectures some, it seems,
And journeys round as well,
But never went on such a trip
As his initials spell.

The next, bluff, hearty fellow he,
And everybody's friend,
He's nicknamed "Jack" as you all know
Who this affair attend.
I dub him "Colonel" here tonight,
Instead of "*Sargeant*"—Why?
The reason's plain, its due him, for
He hails from old K—Y.

Our business in society
Must represented be.
Buck Wallingford's the man who fills
The station to a T.
He goes to Washington at times
State weddings to attend,
He's always right up in the swim,
His good times never end.

Sam Whitaker in his new job
Is surely making good.
He keeps his prices to himself,
Says nothing—and saws wood.
The old man knew he'd do all right;
His confidence Sam won;
He couldn't have thought more of him
Had he been *Isaac's—son*.

The next is one to all well-known
And *Pollock* is his name.
He's noted for his dignity
And great, big, manly frame.
He takes life easy now, they say,
Needn't work like you and I.
Perhaps *we'll* get there, too, some day,
Yes, *per*-haps bye-and-bye.

There is a chap the ladies like,
And he likes them, they say,
Just incidentally, of course,
To while the time away.
But he gets orders just the same
And don't you forget that,
Bob Nicholas, the jolly one,
He wears the derby hat.

One of the best men in our town
Is *Mr. D. B. Meacham*.
He runs the big Y. M. C. A.
Where all good things they teach 'em.
The boys all think that he is great,
He's one of them, you know,
And if they ever get hard up,
He's right there with the dough.

A new man in our city's midst
Is *Willard Wilson* here;
He comes well recommended, but,
There's just one thing to fear.
If *steel* his specialty has been,
E'en measured by the ton
That graft of his will have to stop
Since here "the lid is on."

Next, prince of story-tellers he
Lew Walter is his name;
Inimitable in the art—
His tongue has brought him fame.
His anecdotes are in demand
Wherever he may be;
He's always got one right at hand
And sometimes two or three.

A hustler in the pig-iron ranks
Has this next friend become.
He seems to have some trade on hand,
Be business good or bum.
But just right now he's at his ease—
Will Eaton hurt him any?
Well, no, we hardly think it will—
Unless he takes too many.

Another good man on the list
From 4th and Walnut comes;
He's in the class of thoroughbreds;
He doesn't trot with bums.
When Eaton is out on the road
And cannot be in town,
The office is completely safe
While *Herb Black* holds it down.

Who wrote this rot is also here
And now I guess we're through,
Enough is plenty, any way,
He thinks, and say, don't *you*?

Tributes to Mr. Forker.

A letter was read from Mr. J. A. Green, of Matthew Addy & Co., expressing his regrets at not being able to be present and expressing his entire accord with all the complimentary sentiments which might be tendered to Mr. Forker on the occasion.

Mr. John Sargeant, of the Domhoff & Joyce Co., spoke of the high degree of honesty of purpose of Mr. Forker, of his unfailing truthfulness and of his presence in the pig iron fraternity acting as an elevating influence in business integrity. He said Mr. Forker furnished a high type of man whose example was worthy of emulation. As a competitor he never resorted to any unfair methods, was always clean and straightforward and in a market and territory where the keenest competition was to be met.

Mr. S. H. Whitaker, of the Dayton Coal & Iron Co., spoke of the sense of personal loss which he felt in the leaving of Mr. Forker, but was glad that the move meant an advancement for him and that the Cincinnati trade would always rejoice when any good fortune might come to Mr. Forker.

Mr. Buckner Wallingford, of Walter-Wallingford & Co., spoke in an amusing and entertaining manner and warned Mr. McKee, who succeeds Mr. Forker, as the Cincinnati representative of the Republic company that the trade had been accustomed to working against a strong man and that Mr. McKee would have a big contract on his hands to fill Mr. Forker's place.

Mr. McKee responded by saying that he was glad to make his initial bow to the Cincinnati pig iron fraternity under such happy circumstances. He said he had no fear of not being able to take care of the office, as Mr. Forker was still with the Republic company and he would have his wise counsel and strong, sturdy strength to call upon in time of need.

Mr. Will Eaton, of Hickman, Williams & Co., gave his testimony of friendly interest in the guest of honor, closing with an appropriate toast.

Mr. J. K. Pollock, of Rogers, Brown & Co., spoke of the pleasure it had always been to him to number Mr. Forker among his personal friends. He had always been glad of every opportunity which brought them into personal or business contact and was glad to be present on an occasion which was a spontaneous and concrete expression of the high esteem in which his friend Mr. Forker was held by his competitors, fellow workers and business associates.

Mr. Willard Wilson, who has been a long time close friend of Mr. Forker, and who came here from Birmingham only a few months ago, spoke of his high personal esteem for him and that his long friendship had only tended to increase his respect and admiration.

Formality was dispensed with for

the most part and the addresses were interspersed with repartee and everyone took the liberty of criticizing the speaker. If anyone ever held the opinion that the Cincinnati pig iron men were otherwise than good fellows, he should have been able to look in upon the Forker dinner to have had such an idea dissipated.

Mr. Forker expressed his appreciation of the compliment paid him in a feeling manner with well chosen words.

Those present represented the selling agencies which dispose of more pig iron tonnage than is sold through any other city in the country. A glance at the list of guests showed that the gathering was one of the most representative of its kind. The attendance in point of numbers was not large, but it represented the leading men in the business and each guest was a personal as well as a business acquaintance of Mr. Forker, the guest of honor.

PERSONAL.

Andrew Carnegie has given an additional $2,000,000 for the maintenance of the Carnegie Technical Schools. His previous gifts to this institution were upward of $1,000,000.

George E. Camp, superintendent of the Standard Harrow Works, on April 1 will become superintendent of the International Heater Co., Utica, N. Y., succeeding John A. Rathbun.

L. L. Tatum has been made purchasing agent of the Bullock Electric Co., Cincinnati, succeeding E. M. Lea who has been connected with the Ferro Concrete Construction Co., of that city.

Walter C. Allen has been made general superintendent of the Yale & Towne Mfg. Co., Stamford, Conn., succeeding to the place made vacant by the recent death of Frederick T. Towne.

W. G. Mather, president of the Cleveland-Cliffs Iron Co., Cleveland, and J. Calvin Holt, of the Superior Charcoal Iron Co., have returned from an extensive tour of investigation through Sweden, Germany and Hungary.

A. H. Beatty was elected president of the Norwalk Steel & Iron Co., Norwalk, O., at the annual meeting held last week. W. E. Stockton was chosen vice president, James G. Gibbs, secretary and treasurer and C. T. Torsell, general manager.

Herbert M. Carson, superintendent of motive power of the Pennsylvania railroad at Buffalo, has been appointed to a newly-created position of assistant to the general manager. For the purpose of effecting further economies in shop practice and maintenance of way he will conduct a cost bureau on novel lines.

F. S. Kretsinger, president of the American Fork & Hoe Co., Cleveland, sails in a few days for an extended tour of Europe, which will necessitate his absence from the American Hardware Association's meeting at Hot Springs, W. Va., in June. He is president of the association.

H. C. Parker, San Francisco, Cal., manager for the Stanley-G. I. Electric Mfg. Co., has been made acting district manager to succeed F. V. T. Lee, who resigned to become assistant to president John A. Brittin of the Pacific Gas & Electric Co. G. I. Kenney, manager of the Seattle office, will be associated with Mr. Parker.

A. McWhirter, secretary to the president of the American Sheet & Tin Plate Co., has resigned his position, effective April 5, to become assistant to the president of the Newfoundland Syndicate, 43 Exchange Place, New York. Mr. McWhirter has held his present position under the various presidents to the American Sheet & Tin Plate Co., since July 1, 1901, prior to which time he was claim agent and assistant in the operating department of the National Steel Co., until it was taken over by the Carnegie Steel Co.

J. B. Pero, for thirty-three years connected with the Chapman Valve Co., Springfield, Mass., during most of the time serving in the capacity of foundry superintendent, has retired from active life. He was born in Canada 74 years ago, and is one of the oldest and most widely known foundrymen in the eastern states. He helped inaugurate the plant of the Chapman Valve Co. in 1874 and has done much towards its development. His seven sons were all practical molders and with the exception of one who studied medicine and later died are all still engaged in the foundry business in various capacities.

OBITUARY.

James Halpin, head of the James Halpin Mfg. Co., St. Louis, Mo., died recently at the age of 69. He was a native of Ireland, came to this country 60 years ago, and grew up in the furnace business.

J. Vaughn Merrick, an expert engineer, best known for his work in marine designing, died at his home in Philadelphia, March 28 at the age of 78. He designed the machinery and marine engines for the vessels of the navy during the civil war and was a member of the department board of experts. He was a vice president of the American Society of Mechanical Engineers in 1883, was a trustee of the University of Pennsylvania and held many other positions of trust.

G. Martin Brill, president of the J. G. Brill Co., street car builders, died of apoplexy, March 31, at his home in Merion, Pa. Although 62 years old, he enjoyed splendid health until the day preceding his death, but he did not regain consciousness after sustaining the stroke. With his father Mr. Brill organized the great street car plant, and its success was largely due to his work in an executive capacity.

James C. Beach, until a month ago treasurer of the Railway Steel Spring Co., died as a result of an attack of pneumonia, at Bloomfield, N. J., March 21. Mr. Beach was born in New Jersey 79 years ago, graduated at Princeton and entered banking, from that he became interested in the manufacture of paper and was later connected with the Allen Paper Car Wheel Co. Besides being a large stockholder in the Railway Steel Spring Co., he was heavily interested in the Lappan Brake Shoe Co.

John Christian Kafer died at Trenton, N. J., March 30, after several years of poor health. He was born in that city in 1842 and followed the engineering profession all his life. During the war he served as a naval engineer and continued in that capacity after its close. He was for a time principal assistant to the engineer-in-chief of the navy and served as an instructor in Annapolis. He once declined the professorship of mechanical engineering at Cornell, and some 20 years ago became associated with the Morgan Iron Works, New York, serving in various official capacities. He later became connected with the Quintard Iron Works, and within the last month organized the consulting firm of Kafer, Mattice & Warren, of New York.

Henry A. Hawgood, Cleveland, O., president of the Hawgood & Avery Transit Co., operating one of the most extensive fleets of freighters on the great lakes, died April 3, of heart failure. He was a native of Scotland, and was born sixty years ago. The first steel vessel built for the Hawgood interests was the S. S. Curry, which came out in 1893, and was then the largest vessel on the lakes. This was followed by the Wisconsin, Umbria, H. B. Hawgood and Etruria. The Harvey D. Goulder was launched last Saturday and two other 11,000 ton freighters had been ordered from the American Shipbuilding Co. Mr. Hawgood was also interested in a number of vessels along the Pacific coast.

The Lima Locomotive & Machine Co., Lima, O., has recently shipped four locomotives to Chile.

A Large Air Compressor and Rock Drill Shop.

The Plant of the Ingersoll-Rand Co. at Phillipsburg, N. J.

BY AN EDITORIAL REPRESENTATIVE OF THE IRON TRADE REVIEW.

The product of the Ingersoll-Rand Co. varies from exceedingly heavy compressor units to pneumatic hammers and similar tools, and hence, the design of a plant for constructing this varied line, presents a number of engineering problems not to be found in the design of an ordinary factory. The plant as now laid out is as nearly perfect as modern engineering science can make it. The site selected is on the ground overlooking Phillipsburg, N. J., which is just across the river from Easton, Pa., where the works built some ten years ago are located. The land comprises 200 acres situated 200 feet above the river level, and where exceedingly good railroad facilities can be obtained. The high elevation insures good drainage and freedom from flood troubles. The eighteen buildings are provided with an abundant water supply, good light, room for trackage, and also for future addition to the shops. In laying out the plant a number of factors were taken into consideration. It was recognized that the foundry was a separate department, and should be so located as to enable the work in this department to be carried on with a maximum of efficiency. To facilitate the handling of pig iron, coke and other materials, the foundry floor is placed 18 feet below the level upon which the main shops are located. The foundry department will be considered in detail later.

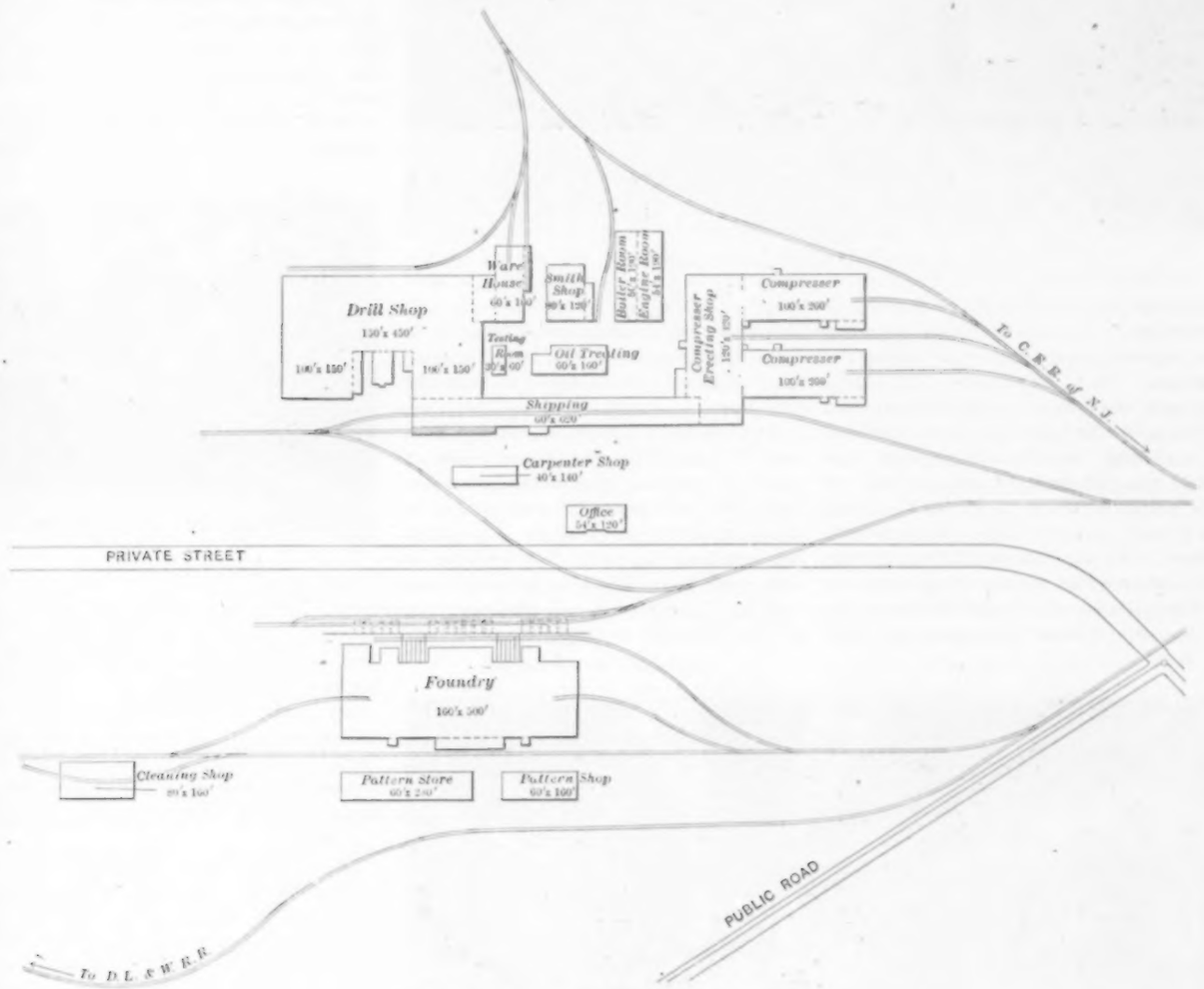

FIG. 1—PLAN OF INGERSOLL-RAND WORKS.

In laying out the manufacturing department, it was recognized that there were two radically different classes of machines or equipments to be taken care of, but both classes must be shipped. Hence, the shipping room forms the connecting link from the ends of which the manufacturing departments radiate. These departments are separated by a space which gives ample room for the power plant, blacksmith shop, oil treating department and testing room, as these latter have to do with both of the regular manufacturing departments. The construction is such that each department can be extended indefinitely without interfering with the other, as can be seen by referring to the ground plan of the works.

Transportation Facilities.

For moving material from one build- to another, about the yard, and for general transportation purposes, the company has 4½ miles of standard gauge track which connects with spurs of the Delaware, Lackawanna & Western R. R. and the Central R. R., of New Jersey. No narrow gauge railroad system is used, and hence, there is no danger

of grade crossing accidents between the narrow and standard gauge systems. All of the handling of supplies in the buildings proper, is carried on either by means of the standard gauge tracks or cranes. In the manufacturing department the traveling cranes are so arranged that work may be passed from one to another throughout the entire plant. The crane arrangement is very well shown in the view of the compressor erecting shop. The ends of the crane run-ways in the two parts of the machine shop can be seen entering the erecting shop on the left, while the run-way for the crane extending through the shipping department can be seen at the right at the further end of the shop. By this arrangement material can be brought from either of the machine shops into the erecting shop and delivered under the erecting crane. The finished machines can also be delivered by the erecting crane to the traveling crane in the shipping department. Similar arrangements have been made in all of the other departments.

FIG. 2—EXTERIOR OF FOUNDRY.

FIG. 3—MAIN BAY OF FOUNDRY.

The Foundry.

As already stated the foundry department with its auxiliary buildings stands on a level 18 feet below that upon which the main works stand. The foundry building is 195 feet wide and 500 feet long. It is built of steel and brick construction, with a slag roof. The central bay is 65 feet wide and is spanned by four 20-ton electric traveling cranes. There are also a number of five-ton auxiliary traveling wall cranes which are electrically driven and operated. In the side bays are located four electric cranes, two on each side. One of the cranes in the west bay is provided with an extension which can be run under the run-way of the cranes in the central bay, so as to pick up a ladle of iron in the central bay and carry it to any point in the side bay.

The foundry floor is divided into several parts, devoted respectively to machine molding, green sand molding and loam molding. The central bay is devoted to the heavy work. The molding machine department is situated in the west bay, which is opposite the cupolas. A portion of the east bay is also devoted to light molding, and includes cylinders for the smaller sizes of air compressors. The cupolas are arranged in two groups of two each so placed as to divide the length of the foundry into three practically equal divisions. Between the cupola charging platforms is situated the core department which is equipped with eight large ovens 18 feet x 12 feet and 14 feet high. The doors of these ovens are of steel and are provided with a vertical lifting mechanism operated by hydraulic cylinders. Either coal or oil may be used as fuel. In addition there are two small core ovens situated near one end of the foundry. About one hundred boys are employed in the core department.

The foundry office is situated near the center of the foundry and opposite the cupola. At one side of the office is located a sand storage department where a portion of the sand is kept.

The iron melting equipment consists of four cupolas; one a Whiting with an 86-inch shell lined down to 66 inches, and three Colliau cupolas, one 66 inches inside of the lining and the other two 60 and 48 inches respectively. Blast for these cupolas is supplied by Green-

FIG. 4—FOUNDRY STORAGE BINS.

Baker blowers geared to electric motors. The blowers for the larger cupolas are driven by 65-horsepower General Electric motors, while the smaller blowers are operated by a 50-horsepower and a 30-horsepower Crocker-Wheeler motor. The metal is conveyed from the cupola to the foundry by means of a transfer truck on a standard gauge track aided by the various cranes.

One of the most important features in connection with the melting equipment is the storage yard, which is located on the same level as the main buildings of the plant, there being two bridges across which the iron, coke and limestone are trucked to the charging platforms. The foundry storage yard for pig iron, coke, etc., is situated on top of a set of concrete bins which are used for the storage of molding sands, fire clay and similar supplies. These bins together with the bridges connecting the storage yard with the foundry are plainly shown in one of the accompanying illustrations which were taken during the construction of the foundry and before the equipment was put into commission. This arrangement brings the sand and sup-

plies used on the molding floor on a level with it, thus reducing the work of handling.

The Brass Foundry.

The brass foundry is located in the east bay at one end of the main foundry. The metal is all melted in two 42-inch Swartz furnaces using oil fuel. The cores for the brass department are also made in the regular core room. The most of the work is put up by hand in snap flasks or in regular standard iron flasks used for this class of work.

Flask Storage.

The storage and handling of heavy flasks and rigging has been taken care of very simply and efficiently by arranging a ten-ton traveling crane with a span of 50 feet, which covers the space between the foundry and the pattern storage and pattern shop. This is clearly shown in one of the illustrations, which also shows the lean-to

FIG. 5—BRASS FOUNDRY.

which contains the foundry office. A standard gauge railroad track extends the entire length of the flask yard and serves for transporting rigging to and from the foundry.

Pattern Shop and Pattern Storage.

The pattern shop and pattern storage are located opposite the foundry building both being of what is commonly called New England mill or slow burning construction. The pattern shop is 60 x 160 feet, and the lower floor is divided into two divisions one of which is devoted to the making of flasks and the other used for heavy pattern work. All three of the departments are fully equipped with wood working machinery. The glue pots used in the pattern shop are electrically heated and all of the labor saving devices found in most of the modern pattern shops have been introduced. About thirty pattern makers are regularly employed.

The pattern storage warehouse is situated immediately north of the pattern shop. This building is three stories in height, 60 feet wide and 280 feet long and is also of slow burning construction. There are six fire walls which divide each floor into seven compartments. The openings through the fire walls are closed by automatic fire doors held open by fusible connections. The floors are constructed of two layers of heavy planking separated by a layer of 3/8 of an inch of asbestos. Both the pattern shop and the pattern storage room are equipped with sprinkler systems for fire protection.

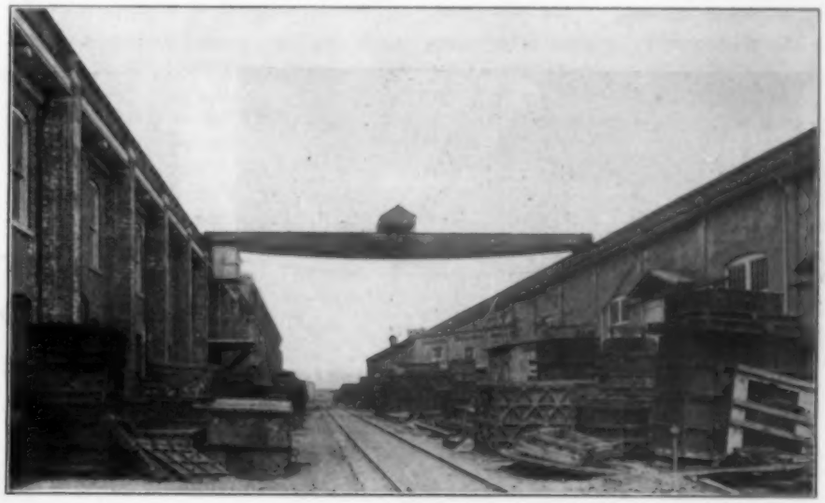

FIG 6—FLASK STORAGE YARD.

The pattern shelving is of wood, the shelves being made of narrow strips which would allow the sprinkler system to reach all parts of the shelving, and thus greatly increase its efficiency in case of fire. The patterns are all recorded in a suitable card index system by which the man in charge keeps track of each individual pattern.

Chipping and Cleaning.

To make provision for the enlargement of the plant by extending both the pattern storage and foundry to the north, and also to remove the dust incident to cleaning as far as possible from the foundry, the cleaning room has been located several hundred feet north of the foundry. It is on a line with the pattern storage and pattern building, and will form one of the buildings in that series when the plant is extended northward a sufficient distance. The building proper is of steel and brick construction 80 x 160 feet and is divided into a 40-foot center bay and two 20-foot side bays. The rough castings are brought from the foundry to the center bay by cars on the standard gauge track. They are then shifted to any required place by means of two 20-ton cranes in the main bay. The side bays are also equipped with hand operated cranes. In addition there is a room for sand blast operations, a set of tumblers, the necessary grinding stands equipped with carborundum wheels, an exhaust system for carrying off the dust, and an equipment of pneumatic chipping hammers.

Finishing and Erecting Shops.

As has already been pointed out, these departments are so grouped that the shipping department forms the connecting link between the different units. The office building which contains the offices and drawing rooms is located midway between the manufacturing buildings and the foundry. The castings from the foundry are delivered to the shops upon cars hauled by the locomotive belonging to the company. The cars enter the buildings at several points, and the cranes serve to transfer the castings from the cars to the machines and thence to the erecting shop. The manufacturing department is divided into two parts which can be considered separately. These are the compressor finishing department and the drill manufacturing department.

Compressor Finishing Department.

This department has been laid out with the idea of providing for a large amount of expansion. The erecting shop proper runs at right angles to the shipping department and can be extended east so as to provide for a number of additional machine shop bays. As the plant now stands the erecting shop is 120 x 300 feet, and there are two machine shops each 100 x 260 feet. The ground space in each of these twin shops is divided into a center bay 40 feet wide, and side bays 30 feet wide. The center bays are spanned by 20-ton traveling cranes which are provided with 5-ton auxiliary hoists as are all the cranes throughout the plant. The construction of all of the buildings in this group is similar, the frames being of steel with brick walls and a roof supplied by the Metropolitan Fireproofing Co. At present there are some 200 machines included

in the equipment of this department comprising lathes, planers, drills, etc. The larger machines are driven directly by electric motors of the Crocker-Wheeler type. For supplying power to the smaller machines a line of shafting is run along each of the side bays, the shafting being operated by Crocker-Wheeler motors. The finished work is delivered from the machine shops into the erecting shop by the machine shop cranes. For the erection and testing of the compressors, a series of heavy concrete foundations constructed to fit the different types of machines is provided. The view of this department was taken previous to the installation of any of the special machinery or to the erection of any of the compressors, but shows the construction very plainly indeed. All of the machines manufactured by the company are erected and tested under regular working conditions previous to shipment. The travelling crane in the testing department has a 70-foot span and is fitted with 20-ton main hoist and 5-ton auxiliary.

One point in the arrangement of the compressor erecting shop that is of interest is the pit or tunnel extending the entire length of the erecting shop under the floor. Through this tunnel, the steam, exhaust and air pipes for the compressors under test are carried. In the illustration, the passage is shown open. When in use, all of this tunnel except the portion under the compressors is covered with plank.

The Shipping Department.

This department is 60 feet wide by 620 feet long. A standard gauge track runs the entire length of the building, and the cars to be loaded are run in to approximately the places where the machines they are to receive are being boxed. The traveling cranes operating in this department bring in material from the shops at either end, after which it is boxed and crated ready for shipment. The cranes then load the material on to the cars.

Drill Manufacturing Department.

The machines manufactured in this department are all comparatively light, so that a man can lift or handle almost any piece. As a consequence no extensive crane system is required. Then too, the manufacturing of this department is carried on in large quantities and to a large extent by special machinery, hence, the conditions to be met are radically different from those which apply to the compressor department. One of the important points in laying out a plant for this class of work is to provide for the handling of a large number of small pieces to and from the machines, and also to provide for taking care of orders for duplicate parts without confusion. For the pistons and most of the small pieces, special trucks are provided which take care of a certain number of parts and this not only simplifies the handling, but also the keeping track of the different orders.

As no crane system is required there is no objection to the use of countershafting and belts, and as most of the machines are light, this method of power transmission is especially adopted for the department under consideration. The economical handling of the material in this department demands that the machines be grouped in a certain order, and the volume of business necessitates a large floor area which must be provided with light and proper ventilation facilities.

The ordinary saw tooth roof construction is suited for this class of work, but with the wind in certain direction does not ventilate well in hot weather. To overcome this difficulty a combined saw tooth roof and a monitor roof construction was adopted. Across one end of the entire department there is a bay 60 feet wide, which is provided with a traveling crane that connects

FIG. 7—COMPRESSOR ERECTING SHOP.

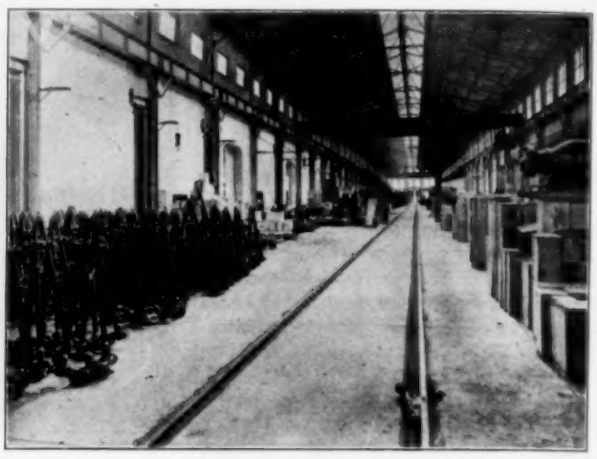

FIG. 8—SHIPPING DEPARTMENT.

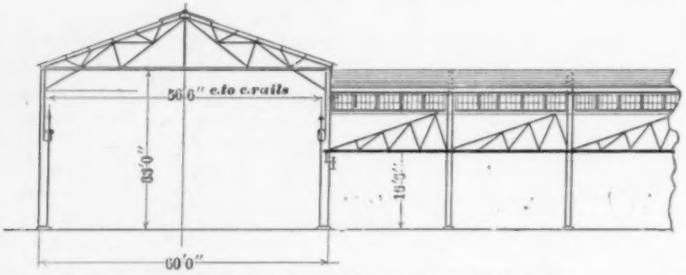

FIG. 9—NORTH AND SOUTH SECTION OF DRILL SHOP.

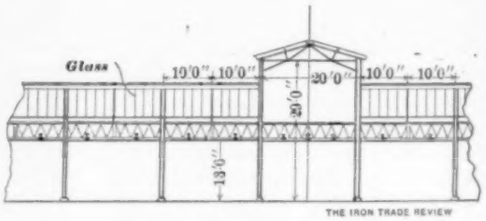

FIG. 10—CROSS SECTION OF MONITORS AND SAW TOOTH ROOF

with the shipping department. At right angles to this building there are some monitor sections 20 feet wide rising above the general level of the saw tooth roofs, as shown in one of the accompanying illustrations. The saw tooth bay sections run parallel with the main bay at the side of the department. The general construction of the saw tooth sections is shown in another of the illustrations, the skylight in the saw tooth roof being on the north. The drill shop is 260 x 450 feet. Of the 18 bays 15 are provided with line shafting.

Tool System.

This company has carried on very careful experiments leading up to the adoption of a suitable steel for the cutting tools. This has resulted in the use of high speed steel for some tools and carbon steel for others. Standard angles and shapes have been adopted for all of the tools and they are ground in the tool room. The lathe tools are ground on Sellers grinders.

When a workman requires a new tool he presses a button at a station near his machine which shows on an indicator in the tool room where the tool is desired. A card is then stamped with a time stamp, given to a messenger boy and by him taken to the man, who writes in the name of the tool desired, and if he wishes to return an old one, hands it to the boy. The messenger returns to the tool room, secures the tool and delivers it to the man. When the new tool is issued the fact is recorded, together with the name of the workman receiving it, and when it is returned the time during which it has been in service is noted. This system gives a check on the life of the tools and also upon the care with which each of the different men handles them. The fact that the cards are stamped when the boy starts and when he returns show at a glance the time that he spent performing the errand. The boys are sent out in rotation, the first boy in being the first boy out, and the boy who is most active naturally goes to the head of the line most frequently, and does the most errands. To reward such diligence, prizes are given which are usually in the form of mechanics' tools.

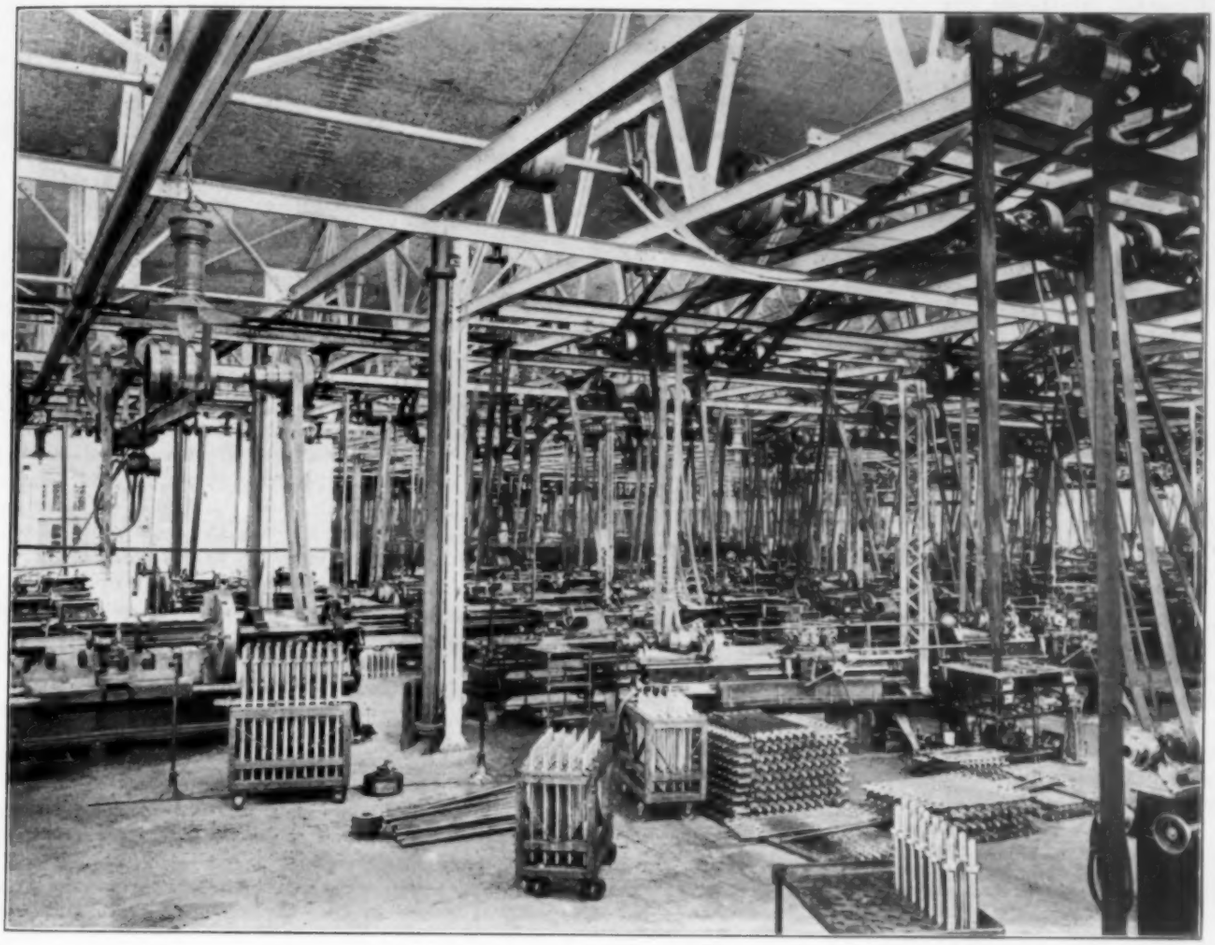

FIG 11—DRILL MANUFACTURING DEPARTMENT.

Power Plant.

The power plant is centrally located and the fuel is delivered to it directly from the railroad cars. The boiler room is 48 x 190 feet and the engine room 52 x 190 feet. The present boiler equipment is 1,500 horsepower, but space is reserved for 1,000 horsepower more. There are three batteries, each containing two 250-horsepower Stirling water tube boilers. The coal is delivered from the railroad cars into a hopper from whence it passes through a crusher if necessary, and is then elevated from the basement by a Caslin self-dumping conveyor which delivers it to a series of Berqvist suspension hoppers, which are 24 feet wide and 14 feet deep and have a capacity of 1,300 tons. The coal used is anthracite slack with about one-sixth of its weight of bituminous slack mixed with it. The boilers are equipped with Roney stokers. The same conveyor handles the coal and removes the ashes from the building. A Custodis stack 200 feet high and having a flue space 8 feet 6 inches diameter, furnishes the draft for the furnaces. There is a Green fuel economizer at each side of the stack and two Cameron feed pumps of 1,000 boiler horsepower each, a Cochrane feed water heater of 2,000-horsepower

capacity and a 1,000-gallon Worthington underwriters pump, and a 300-gallon drip pump.

The engine room equipment includes a 10-ton crane, three 300-kilowatt and one 100-kilowatt generators, all of the Crocker-Wheeler type and direct connected to cross compound condensing engines; one class H Ingersoll-Sargeant air compressor for supplying air for the chipping department at 30-pounds pressure and also for the sand blast apparatus. This compressor has compound steam and duplex air ends. There is, besides, a class C air compressor, compound steam and air, having Corliss steam end and Ingersoll-Sargeant latest type air cylinder with air actuated valves, to supply the pneumatic tools throughout the plant.

Two Conover condensers of 1,000-horsepower capacity each take care of the steam from the engine, and two DeLaval steam turbines of 50-horsepower capacity direct connected to centrifugal pumps circulate water for the hot water heating system.

The main switchboard has 13 panels divided into machine, lighting and power sections.

Steel Treatment Department and Blacksmith Shop.

The machines manufactured by this company have long been noted for their wearing qualities and also for their uniform work. These qualities are largely due to the careful treatment which the steel receives both in the blacksmith shop and in the steel treating department. A building 60 x 100 feet is devoted entirely to the treatment of steel and here all of the parts are hardened, tempered or annealed as they may severally require. The tool dressing for the various shops is also part of the duties of the 20 to 25 men constantly employed in this building.

The equipment of the department includes a special double annealing furnace having 10-foot ovens, two double 5-foot annealing furnaces, two No. 2 double case hardening furnaces, all of the Brown & Sharpe type, oil tanks for oil treatment, brine tanks, lead pots, straightening presses and an 800-pound steam hammer and three forges on the down draft system.

The blacksmith shop is a building 80 x 120 feet. It contains large heating furnaces with a waste heat boiler occupying the space between two 2,500-pound steam hammers, a 2,000-pound hammer and two others, 1,500 and 1,100 pounds respectively, seven forges, four furnaces for drop work, three drop hammers 400, 600 and 800 pounds, two presses for cutting, etc., and one bolt header. A down draft exhaust system installed by the Buffalo Forge Co. leads to an underground main. A line of shafting directly driven by two 50-horsepower General Electric motors operates the drop hammers.

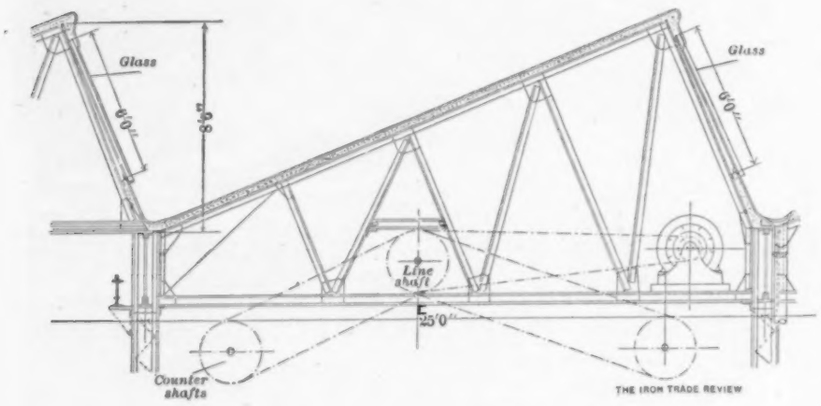

FIG. 12—DETAIL OF SAW TOOTH ROOF.

The Subway and Water Supply.

An underground passage with internal dimensions of 6 x 8 feet connects each building with all the rest of the group. It is the main artery of the plant and through it is transmitted all the power developed in the power plant. The foundry being on a lower level is not on a subway line, the pipes and cables being carried from the tunnel end at the terrace dividing the two levels, into the foundry by suspension under one of the bridges.

The main water supply of the works is obtained from a stream among the hills some five miles away. The elevation of the source is sufficient to furnish all the pressure desired. The water is supplied by the Hopatcong Water Co., which maintains a concrete dam 25 feet high for storage with a capacity of 31,000,000 gallons.

MITIS METAL.

Mitis iron is obtained by melting wrought iron in crucible furnaces without adding anything else to the mixture. The castings thereby obtained, neglecting the slight changes that may take place during the melting of the raw material in contact with graphite crucible, are of the same nature as the raw material used.

In their manufacture, crop ends of Swedish iron are mostly used with the results that the castings obtained are soft and of excellent quality. If a wrought iron of inferior quality is melted, naturally the casting obtained is of an inferior quality. If soft steel crops are melted, the resulting casting will have a steely nature.

A special furnace provided with three compartments with two graphite crucibles, of a capacity of about 60 pounds metal, in each compartment, or six crucibles to the furnace, is used. The furnace is heated with liquid oil from one end. The temperature obtained is high enough to melt and liquefy the metal contained in the row of crucibles nearest to the flame. Ten minutes before casting, in order to render the metal more fluid, an addition of about 0.05 to 0.1 per cent of ferro-alluminum is made The aluminum thus introduced will react on the oxide of iron naturally contained in the liquid wrought iron, thus removing the cause of blow holes. The metal so heated will remain very quiet during the casting operation and the castings obtained will be smooth and solid.

After the metal from the first row of crucibles is poured, the two succeeding rows are advanced each one compartment and the two newly prepared crucibles are put in the rear compartment. The melting takes about 1¼ hours so that about from eight to ten heats or melts are made in twelve hours.

Each crucible lasts from five to six heats. It can be noticed that about 120 pounds of castings are obtained per heat. Special precautions are taken during the pouring of the metal.

The crucibles are made of graphite of good quality. The molds, very refractory, are prepared from refractory materials of good quality, which after having been burnt and pulverized to a fine powder are agglomerated by means of molasses or a sugar solution.

The castings obtained are better than malleable iron; they can be bent to a certain degree when cold, and can be forged when hot.

They require no annealing of any kind.

FOUNDRY COSTS.

BY R. W. MCDOWELL.

A cost system is intended to show the cost of production and not as an aid to making guesses at the cost. If estimates are all that is required, a tablet of scratch paper and a lead pencil should answer the same purpose as the most elaborate cost system that was ever devised.

It is surprising to note the number of foundries whose cost systems are run with a view of getting a general estimate as to how much the product is costing, and there is no really good reason for this, for if the cost system and the general accounting system are gotten up in such a manner as to work in harmony with each other, it is just as easy to get accurate costs as it is to get estimates.

If the foundry is of any size, however, it will be found far better not to attempt to find daily costs, or rather, not to base the system on this principle. Monthly costs are much easier to determine, and can be found with less clerical labor, owing to the fact that nearly everything else around the plant is run on a monthly basis. Again, the matter of factory and general expense can be put in monthly at its exact cost, taken from the general account books, while it is more or less a matter of guess work when daily costs are attempted, and guess work is something which should be eliminated at all hazards.

The system described here is intended more to meet the requirements of the general foundry than for a plant engaged in any particular line of manufacturing, or one making any special kind of castings. To operate such records as are shown here, the plant should be run in different departments, labor and material used in each department being kept track of separately from the other departments. In an ordinary foundry these departments would be foundry, core room, cleaning, grinding and chipping room, machine shop or finishing department, pattern shop, and office. What practically amounts to another department is run under the head of unclassified labor, composed of men who unload cars, move castings about from place to place, and do all other such work of a similar nature which does not properly come under the direction of any particular department, but is more or less associated with all. Each department should have a distinctive color for the forms in use by it, all forms used by this department being of the same color. This simplifies matters considerably for the office, and prevents confusion and mistakes. The foundry forms may be white, machine shop forms yellow, core room forms pink, etc.

The product should also be classified according to weight or the style of castings. Thus, class A may represent castings of over 500 pounds in weight, class B 300 to 500, class C 100 to 300, etc. This matter, however, would have to be determined by the style and kind of castings that are being manufactured, and this is simply a suggestion, as all that is attempted here is to give a general outline for a cost system adapted to general foundry work.

Records of Material.

First in order under this heading are naturally the iron reports and records. These reports are, of course, the most important of any of the records of material, and it is necessary to have them arranged in such a manner as to give full and complete information regarding the iron. Form 1 shows the cupola report which is made up and turned in daily. This is intended to give a full record of the heat, showing the quantities of iron and coke used in each charge and is arranged so that the totals of each separate kind of iron are easily obtained. To insure any accuracy in the mixture of the iron as well as in the cost records, it should be insisted upon from the very start that the utmost care is to be exercised in the weighing and reporting of the various kinds of iron, and that no guess work whatever will be tolerated. Each charge should be carefully weighed, and should immediately be recorded upon a blackboard ruled off in a manner somewhat similar to the upper portion of the form shown. Unless this is rigidly enforced, there will be little use in trying to run an accurate

DAILY CUPOLA REPORT

Date Jan. 9. 1905

Charge No.	Pig No.1	Pig No.2	Pig No.3	Scrap No.1	Scrap No.2	Shop Scrap	Bad Cast	From Heat of	Remelt	From Heat of	Coke	Total
1	829	1521			1296		136	Jan. 7	390	Jan. 7	940	4172
2	820	1464			1218		128	..	387	.. ..	466	4017
3	836	1519			1184		142	..	411	.. ..	472	4092
Totals	11918	20600			17516		1916		4918		7386	56868

Blast on at 1:10 P.M.	Good Castings	44139	Total Iron Melted		56868
Blast off at 5:20 P.M.	Shop Castings		Deduct Result of Heat		53070
Time of Heat 4 H. 10 M.	Bad Castings	2119	Melting Loss		3798
No. lbs. Iron melted per	Remelt	6812	Percent		6¾
100 lbs. Coke 791	Total Result of Heat	53070	Percent Good Castings		95

Remarks:

Foreman

THE IRON TRADE REVIEW

FORM 1—DAILY CUPOLA REPORT.

cost system, for if the iron reports are not strictly accurate in every particular, the balance of the system will be completely thrown out, and the system itself will be worse than useless.

Space is provided at the lower part of the report for information of a general character concerning the heat, also for any remarks necessary. The time of the heat, number of pounds of iron melted per pound of coke, results of heat and melting loss are all shown, part of this information being reported from the foundry and the remainder being figured up in the office. The columns headed "From Heat Of" are provided for the purpose of showing where the remelt and rejected castings should be credited in cases where it is impossible to get these items in shape for melting in the following heat. This should not be allowed to happen any oftener than is absolutely necessary, but it is a matter that will sometimes happen, and these columns are designed to prevent confusion at the times when this occurs.

In this connection it might be mentioned that it is imperative in cases of this kind never to allow these two items out of different heats to become mixed, as there would be no way of obtaining the melting loss should this occur.

The melting loss and the percentage of good castings should also be carefully kept track of for future reference, as it is by comparison of items of this kind that the weak spots in the foundry methods are found out, and measures taken for their betterment. Melting loss is figured on the total charge, and the percentage of good castings is figured upon the total weight of all castings, good and bad. The reports shown here are used by the clerks who look after the stock records as well as those who make up the cost record after which they are filed in a binder in such form as to be readily referred to at any future time. An index tag slipped on the report for the first day of each month makes reference easy. It is a good plan to refer to these reports day by day and compare the various heats thus keeping informed as to whether or not they are running regularly.

IRON REPORT FOR MONTH OF January 1905

Kind of Iron	Weight	Per Cent	Total	Price	Extension	Total
Pig. No. 1	236180	.15⅞		16.00	1587 00	
Pig. No. 2	387200	.25⅝		15.75	2633 07	
Pig. No. 3	79820	.05⅜		13.90	497 08	
Scrap No. 1						
Scrap No. 2	631142	.41⅜		12.50	3291 83	
Shop Scrap	5964	.00⅜				
Bad Castings	52811	.03⅜		15.60	438 35	
Total	1393117	.92⅛				
Add Remelt	118918	.07⅝				
Total Iron to Cupola	1512033	1.00	1512033			
Total Cost					8550 33	
Good Castings	1259712					
Shop Castings	3622					
Bad Castings (Deduct)	54158				422 49	
Remelt	118915					
Total Results	1437516		1435816		8127 84	
Loss		5%	76217			
Add Cost of Coke, Flux, etc.					202 50	8330 34
Cupola Labor						227 50
Labor Handling Iron						86 10
Cost of Iron to Molder						8643 94
Cost per lb.				.00502	.00583	

THE IRON TRADE REVIEW

FORM 2—MONTHLY IRON REPORT.

At the end of the month, the monthly iron report, Form 2, is made up from the daily cupola reports. The total weight of each kind of iron that has been used during the month is entered, together with the shop scrap and bad castings, and is figured at the cost value. The percentage of each kind is also figured. Remelt is then added to the total weight, but does not figure in the costs for the reason that remelt should run practically the same day by day, and therefore an amount would be added in which would have to be deducted later. The weight of the total results from the heats of the month, including good castings, rejected castings and remelt, is added up and deducted from the gross weight, giving the melting loss for the month, together with the percentage. The weights of the good castings and rejected castings are obtained from the production sheets, which will be described farther on. The value of the rejected castings used in the cupola during the month is deducted from the entire cost of iron melted, giving the net cost of iron. The cost of coke, flux, etc., is then added to the net cost of iron together with the cupola labor and the labor of handling the iron, which gives the cost of the iron as the molder gets it from the cupola. From this amount the cost per pound of the iron may be figured, together with the cost per pound of the iron in the good castings. The latter item is necessary for the purpose of figuring up the cost of separate orders, and should be accurately kept monthly. When finished, this report is set aside to be used in figuring up the cost sheet, and is afterwards filed.

DAILY MATERIAL REPORT

Date Jan. 13, 1905

Materials	Source	Quantity	Chk.
Molding Sand (lbs.)	#1	1169	11
Molding Sand "	#2	6320	12
Facing "	O.	108	6
Facing "			
Oil (gal.)			
Chaplets (lbs.)		16	19
Limestone "		400	28
Flux "			
Fireclay "		14	2
Other Materials			

THE IRON TRADE REVIEW J. C. Wilgus Foreman

FORM 3—DAILY MATERIAL REPORT.

REQUISITION FOR MATERIAL.

Date Jan. 13, No. 227

To B. R. Dolan Storekeeper

Please furnish the following material to be used on Order No. 586 Turn these requisitions in to the office daily.

Amount	Material	Weight	Check
4	pcs 3½" round iron 3 ft 6 in	8 lb	

This space for office use.

Entered, Stock Record 38

Entered, Cost Records a. jo

J. C. Wilgus.

THE IRON TRADE REVIEW

FORM 4—MATERIAL REQUISITION.

Cost of Other Materials.

The quantity and weight of material other than coke and iron is obtained from the daily material report, Form 3,

RECORD IN lbs OF No. 2 Pig FOR MONTH OF January 1905

Where Kept 101-106 Grade B Minimum Normal Sheet No. 12

Date	Order No.	Weight	Total	Date	Report No.	Weight	Total	Date 1905	Weekly Balance	Balance
1			46498	1				Jan. 2		46498
2				2	1	38700				
3	924	96810		3	2	21100				
30		114694 114694		30	25	18690				
31				31	26	22500	88690	31		181912
Totals		522614	569112			387200	387200			
Deduct			387200							
Balances			181912							

THE IRON TRADE REVIEW

FORM 5—IRON RECORD.

and the requisition, Form 4. The material report is turned into the office each day, and great care should be exercised to have all amounts and weights correct. The report is simple in form, being merely a list of the materials which are used in the foundry, with columns provided for the quantities used. Material that is of such form as to be kept in the store room is issued on receipt of a requisition from the foreman, and no material should be delivered without a requisition. The storekeeper also has the oversight and direction of the issuing of supplies, such as brushes, riddles, etc., a requisition similar in form to the illustration being provided for this purpose. All such requisitions are turned over at regular periods to the stock clerk in the office, who enters them up in his records. The stock records of general materials are similar in form to the iron record shown in Form 5. This report gives a record of the quantity of No. 2 pig iron used during the month, one sheet being used for each month. A sheet similar to this is used for each kind of material used. The form shown here is arranged in such a manner as to permit of a balance being shown at any time desired, and to show the amounts used for any given period of time less than a month. As iron is received it is entered up in the columns to the left of the sheet; iron used is entered in the central columns, and balances on the columns to the extreme right. The same applies to the other materials. With some kinds of material which are not frequently used, it may be desirable to use some form of record which will not need to be transferred to another sheet monthly as is of course, necessary with the records shown here.

Instead of following out the usual custom of taking stock yearly, the plan is advocated of taking an inventory of any particular material that happens to run low at any time, no matter what time of the year or month this happens. When the regular account books are to balance at the close of the year, the amount of material on hand can be taken direct

CORE ROOM REPORT FOR 190

Batch No.	Sand	Linseed	Core Comp.	Molasses	Flour	Rosin	Sunds.	Remarks
1								
2								
Totals								

Names	No.	Kind of Core	No. Made	No. Bad	No. Good	Broken	Delivered	Check
Totals								

Remarks:

Foreman

FORM 6—CORE ROOM REPORT.

from the material records. This plan applies to material and not to finished product, although this latter could be arranged in the same manner.

Department Records.

The records for the other departments outside of the foundry are run in the same manner as the foundry, except that the reports are varied to suit the various kinds of work done in these departments. The core room is sometimes run as a part of the foundry, but will here be considered as a separate department, and a report of material, labor, and product rendered each day. This report is shown in Form 6. It is gotten up on very much the same general style as the cupola report, the upper portion of the sheet being used for a report of the material used in each batch of sand mixed. Linseed, molasses, core compound, flour, etc., are easily measured as issued, and accurately reported, while sand must be weighed and presents more difficulty in reporting. An excellent plan for keeping track of the weight of sand used daily is to have a track from the sand sheds to the core room, running across the scales. All sand should be brought in on a truck holding a considerable quantity, the weight of each load being marked up on a blackboard kept for that purpose, after it crosses the scales. Material not shown in the report is reported from the requisitions on which it is issued.

No. _____

NAME _____

TIME AND PAY CARD.

Month of _____

Total Time _____ Hours

Rate _____ Amount $ _____

Piece Work _____ " $ _____

Total

Deductions _____ " $ _____

Check No. _____ Net Due $ _____

DATE		A.M. IN	A.M. OUT	P.M. IN	P.M. OUT	TOTAL
1						
2						
3						
15						
16						

Time First Half Hours _____

" Second Half " _____

Total _____

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FORM 7.—TIME CARD.

The lower section of the report is intended to show what the production in the core room has been for the day, and to furnish the timekeeper with proper data for making up his payroll, coremakers being paid by the piece as a rule. Columns are provided in this portion of the sheet for total cores made, number bad, number good, and a column for number broken, as it is the usual custom to pay the coremaker for cores broken through no fault of his. These reports are turned in every day, going first to the timekeeper who enters up the coremakers' time in the payroll, after which they are passed on to the stock clerk and are entered up in the material records.

One copy of the shop order, which will be described later, is made out for the use of the core room, in order to let the foreman of that department know just how many and what kind of cores are required, thus eliminating the chance of overstocking on any particular kind of core.

The machine shop, blacksmith shop and pattern shop are the only other departments using material, and this is all issued on requisitions in the machine and blacksmith shops, so that no reports of materials are necessary. The pattern shop ought to be run and considered as a separate department altogether, as it uses a different kind of material and turns out a finished product of its own, thus being practically a separate factory, although under the same management. For this reason it requires a special set of records for its own use, which records constitute a separate and complete cost system.

Labor.

Labor must be carefully accounted for in order to operate a sucessful cost system. For keeping the time of employes, a time recorder of some description is by far the most desirable method. All employes, whether employed by the day or by the piece, should be furnished with a card similar to Form 7, on which their time of beginning work in the morning and finishing in the evening is automatically recorded. Each of these cards bears the workman's number in large type so as to be easily distinguished from other cards, and all cards issued to this particular workman bear this number. These cards are arranged so that the time of an entire pay period is kept on one card, these pay periods being from the first of the month to the fifteenth, and from the fifteenth to the last day.

The number of these clocks or time recorders necessary will depend on the size of the plant and the number of men employed. If the plant is large enough, a clock may be used in each of the principal departments, but the ordinary sized plant will not require as many, and one clock will conveniently take care of 200 to 250 men. Cards for the

FORM 9.—PAY ROLL.

different departments are stamped with the name of these departments, and are kept in racks at either side of the clocks when not in use. These racks are numbered to correspond with the numbers

PRODUCTION SHEET FOR January 9th 1905 No. 7

No.	Names	Order No.	Name of Casting	Pattern No.	No. Class	No. Made	No. Bad	No. Good	Ck.	Wt. Each	Wt. Made	Wt. Bad	Wt. Good	Class A No.	Class A Wt.	Class B No.	Class B Wt.	Class C No.	Class C Wt.	Class D No.	Class D Wt.	Class E No.	Class E Wt.	Ck.
3	G. B. Dalton																							
114	Geo. Hindmarsh Jr.	119	Base for 118	118	29	58	3	55	✓	30	1740	90	1650							55	1650			
115	Francis	110	Block C	47	4																			
89	Williams	113	" 45	49	45	18		18		90	1620		1620							18	1620			
26	J. Perrin	113	Extension	50	45	52	2	50		32	1664	64	1600											
				112	a	1		1			32		32											
											3436	154	3282							73	3270			

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FORM 9.—PRODUCTION SHEET.

on the cards, each card being kept in the rack of the same number. When a man comes to work in the morning he takes his card from the rack at the left of the clock, records the time, and drops his card in the rack of corresponding number at the right hand side and proceeds to work. The same process is gone through with upon quiting work in the evening. After all the men are at work in the morning, a glance at the racks will show just who is at work and who is absent. The timekeeper takes all the cards from the right hand rack each morning and enters the time in the payroll book, a page of which is shown in Form 8, and which will be described later. When he comes to a card used by a man working by the piece, he merely makes a check mark in the proper space opposite the man's name, to show that he was at work on that day, and passes on to the next card. The time of a day-work man is entered in full in the proper space. This process of entering the cards can be done very rapidly by arranging the cards of the different departments according to the way that the numbers run in the book, and then entering them as they come, a page in the book being devoted to each department, or several pages if necessary.

At the foot of the card a space is provided for a statement of the amount due the user of the card, showing day work, piece work and deductions. These statements are taken around the shop, having been made up several days previous to pay day, in order to correct any mistakes that may have been made. If the card is satisfactory to the workman he signs it, and if there is any dissatisfaction on his part, it will be investigated, and if just, will be corrected before pay day, and the card signed by him. This does away with considerable delay on pay day. This plan was employed by the writer for nearly two years in a foundry with which he was connected, and was entirely satisfactory resulting in quick pays, and far better satisfaction among the men.

Piece work in the foundry and core room is reported by the production sheet, Form 9, and the core room report, Form 6. The production sheet may be made up from cards turned in by the molder and O. K.'d by the foreman, but a better plan is to have the factory clerk go through the foundry just before the men are ready to pour off in the afternoon and make up a report of what each man has put up, giving the molder, number, name and number of helper and the number and mark of the castings put up. From this report the production sheet is made up in three copies, one of which goes to the foundry. When entirely completed, one to the weighmaster for convenience in reporting the heat, and one remains in the office. The "class" columns are omitted from the foundry and weighmaster's copies, a column for the percentage of loss sustained by each molder being substituted on the former. As soon as the weighmaster turns in his completed copy, the foundry and office copies are made out, the office copy going to the timekeeper who enters up the amount due each molder in the payroll book. It then is turned over to the stock and cost clerks for entry on their records, thus serving as a time and a stock record. Its functions as a stock record will be discussed under a different heading.

The core room report is also made up daily and is the source from which the amount due coremakers is obtained, and is entered in the same manner. Piece work in other departments is reported by cards similar to those shown in Form 12, which will be described under the heading of the shop order.

When all day work and piece work has been entered up in the payroll book, the amounts are extended to the proper columns and the payroll made up. It will be noted that the "day work" column is divided into two sections, productive, and non-productive labor, piece work being, of course, productive labor. In this way these two classes of labor are kept separate and distinct at all times, and it is thus easy to figure up the percentage of non-productive labor in a department or for the entire plant, for any period of time. This is necessary for the purpose of getting the cost of a single order or of several orders. This arrangement is also convenient in making up the cost sheet. When a man is changed from productive to non-productive labor, or vice versa, a notation is made to that effect on his card and on the payroll book. The operations necessary for keeping time in the manner here described are much simpler in the operation than they are in the description, and if the work is carefully performed by one clerk and then checked by another clerk, there is no reason for mistakes. Of course, it is natural that mistakes will come up at times, but they will be few, and if the work is properly checked, they will be caught before any harm has resulted from them. In this connection it is desired to impress on the mind of the reader the extreme importance of checking all clerical work of every description. This applies to all work of a clerical nature whether it is done in the office proper or in the factory. And this checking should in all cases be done by a different man from the one who originally performed the work, as one will often fail to notice his own mistakes.

By the operations described above, all labor is recorded and disposed of, with the exception of labor on orders on which separate costs are kept, which class of labor comes under a different heading. This gives the data for making up the cost sheet, with the exception of factory and general expense, but be-

fore describing the cost sheet, the shop orders and stock records will be described.

The Shop Order.

Form 10 shows the shop order, a copy for each of the principal departments being made out. Whenever an order is received, a shop order is made out, and the copies distributed to the various departments. The office copy has the form at the bottom which is shown in the illustration, for the purpose of keeping track of the castings made on an order from day to day. It will be noted in the illustration that on Jan. 4 a shop order was issued for 240 bases, pattern No. 118. On Jan 6, 22 of these bases were made, leaving a balance of 218. On the 7th 56 were made, a total of 78 to date, and leaving a balance of 162. This is continued until the order is completed, thus keeping the office and the foundry foreman informed at all times as to the number of castings required to complete an order, and preventing the foreman from making more castings than ordered. This is only necessary in cases where there are a large number of castings on an order, on which shipments are being made before the order is completed. In cases where there are several different kinds of castings on one order, similar forms may be provided, one for each kind of casting, and attached to the order and kept track of in the same manner. If desired, this form may be left on the foundry order instead of the office copy and kept by the foundry foreman himself, but in the opinion of the writer it is better for this work to be done in the office, as it is not a good plan to burden the foremen with any more clerical work than is absolutely necessary.

SHOP ORDER

Date January 4th 1905 No. 119

To J. Sterling

Foreman

Please get out the following work, reporting all labor and material under this order number 119

240 Bases, Pattern No. 118

Date	Made	To Date	Balance
Jan. 6	22	22	218
7	56	78	162
9	55	133	107

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FORM 10.—SHOP ORDER.

NAME ORDER NO.

ARTICLE Base for emery wheel stand JOB NO

DATE BEGUN Jan. 8, 1905 DATE FINISHED Jan. 10. 1905

MATERIAL	WEIGHT	RATE	COST
CAST IRON	120	0.0658	.79
COKE			
SAND			
CORE OIL			
FACING			
LIMESTONE			
LUMBER			
SCREWS			
INCIDENTALS			12
BRASS			
WROT IRON			
TOOL STEEL			

COST OF MATERIAL			
LABOR	HOURS	RATE	COST
FOUNDRY	8@30	240	3.12
PATTERN ROOM			
BLACKSMITH	3.35@20	.72	.68
MACHINE			
CLEANING			
MISC'D			

91

COST OF LABOR	TOTAL COST	SELLING PRICE	PROFIT
3.80	4.71		

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FORM 11.—SHOP EQUIPMENT ORDER.

Orders for castings for shop use, such as clamps, iron flasks, weights, etc., are of a similar form, but are printed at the top in large type, "For Equipment." The record of the cost of such orders is kept on a card shown in Form 11. These cards are made out as soon as an order is completed, and are filed according to order numbers. If it is desired to keep track of the separate cost of a customer's order, it may be done in the same manner, a different colored card being used to prevent confusion. These cards are 4 x 6 in size, and are kept in the ordinary card index drawer, separate drawers being used for customers' and equipment orders. The cards are so simple as to require but little explanation, being merely a description of the order, and a list of material and labor. Material on these orders is obtained from the requisitions, the iron being figured at the cost per pound shown by the iron report. Labor is reported on a card like Form 12. As soon as a man is put to work on a job, one of these cards is made out for him and his time recorded upon it. The molder's time can usually be obtained from the production sheet, as most of the molder's work is by the piece. In the illustration the card is designed for use with the Calculagraph, and this form is recommended above others for the reason that it eliminates the part of the clerical work most subject to mistakes,—the figuring of the elapsed time—as the machine does this part of the work automatically. If it is not desired to use this machine, however, the space shown in the form devoted to the stamping of the time may be used for recording the time of starting and finishing the work, in the ordinary manner. If however, it is possible to use the machine, the results are sure to be accurate, and considerable clerical work will be saved. The operations listed on the card may be omitted and a blank space left for noting the operation, if desired. When the workman finishes his part of the work he records his time and puts the card in a rack of the same number as the order, from which the cards are gathered up at intervals and turned into the office, where the value of the time spent is figured up and entered on the other card. In case of an order requiring a number of operations to complete, the cards of this order may be kept together in an envelope until the order is completed, when they may be taken out and entered up. As soon as all material

and productive labor is entered on the card, a percentage is added for non-productive labor, which percentage may be easily obtained from the payroll, owing to the peculiar arrangement of the columns. A percentage may also be added for factory and general expense, which may be obtained from the cost sheet. These items are then footed up, giving the total cost of the order. In some lines of foundry work it may be desirable to keep the cost of each separate order that is gotten out, in which case arrangements will have to be made for keeping the molder's time on orders that a considerable period of time is required to complete.

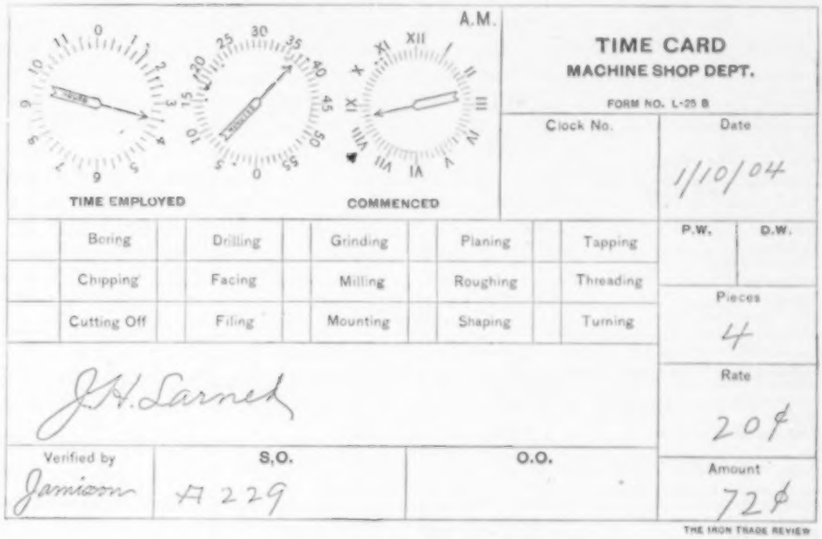
Stock Records.

By stock records we refer to finished castings and not to material, records of which are classed under the head of stores. The stock record is, however, nearly identical with the material record, and is operated in practically the same manner. Usually the castings are shipped out as soon as possible after being made, so the stock record is not very difficult to run. The production sheet has a special column for the weight of each class of castings made, which weights are extended on all production sheets, and are transferred from there to the stock record. This is shown in Form 13. The record of each class of castings is kept on a separate page of this record, and runs for one month, when the balance will be transferred to another sheet. The "made" section of these records is compiled from the production sheet, and the "shipped" section from the invoice copies. The arrangement of the sheet is practically identical with the material record, so further description is unnecessary.

The Cost Sheet.

The cost sheet is shown in Form 14. This sheet is the ledger of the cost system, the other forms shown being the corresponding items to the sales books, cash books, etc., in an ordinary set of account books. The monthly iron report, the material record, the pay roll, the shop order cards, the production sheet, and special columns in the cash book, and voucher record, or purchase book are all made use of in compiling this sheet. It shows the cost of each separate department, giving the cost of each of the principal expense items. The foundry department comes first, then iron, supplies, sundry expenses, productive and non-productive labor and repairs or maintenance. Cost of iron is obtained from the monthly iron report, supplies from the material record, productive and non-productive labor from their respective columns in the payroll book, and sundry expenses and maintenance from the special columns in the cash book and the voucher record or purchase book. These columns are arranged as shown in Form 15, the pages being ruled into spaces for each department, and subdivided into expense and general columns. In this way the actual cost and expenses of various kinds for each department are entered on the cost sheet just as they come from the books of original entry, and are thus a matter of facts and figures instead of guess work. Repairs are taken from the cards containing the record of shop orders, a shop order being issued each month for repairs in each department and all material and labor used for repairs are charged against these orders. This gives all the expense items of different kinds for the foundry for the month, and these are footed up and the total carried into the extension column. The same methods are pursued in getting the costs of the other departments. In addition to the department labor, a space is given to unclassified labor, and when this is added, all labor is accounted for, and will check exactly with the payroll. Factory expense and general expense are taken from the books of original entry, through the columns shown in Form 15, and when these items are footed up, the net cost of production is obtained. Patterns and flasks, freight, taxes, and other items not directly concerned in the cost of production are then added, and the sum of these items and the net cost of production will give the total cost of operating for the month.

There are many, no doubt, who will disagree with the method in use on this sheet of putting the patterns and flask item in the class shown, thinking, rather, that it should go into the net cost of production. There are excellent reasons, however, for classing it as shown. In the first place, patterns and flasks should show in the total cost of operat-


A.M.

TIME CARD
MACHINE SHOP DEPT.
FORM NO. L-25 B

TIME EMPLOYED COMMENCED

Clock No. | Date: 1/10/04

Boring	Drilling	Grinding	Planing	Tapping	P.W. / D.W.
Chipping	Facing	Milling	Roughing	Threading	
Cutting Off	Filing	Mounting	Shaping	Turning	Pieces: 4

J. H. Larned

Rate: 20¢

Verified by: Jamison | S.O.: A 229 | O.O. | Amount: 72¢

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FORM 12.—LABOR COST RECORD.

RECORD IN _____ OF CLASS _____ CASTINGS FOR MONTH OF _____ 190 _____

Made						Shipped						Balance		
Date	Made	Total	Sheet	Wt. Made	Total Wt.	Date	No.	Total	Order No.	Weight	Total Wt.	Date	No.	Weight
1						1						1		
2						2						2		
						3								
30						30						30		
31						31						31		
Total														
Deduct														
Balance														

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FORM 13.—STOCK RECORD.

COST SHEET FOR MONTH OF January 1905 No.

DEPARTMENTS	SOURCE	COSTS	EXTENSION	AMOUNT	TOTAL
FOUNDRY					
Iron	Iron Rept. #1	833034			
Supplies	Stock Record	51680			
Sundries	Journal 86	7118			
Productive Labor	Pay Roll 116	193750			
Non-productive Labor	" " 116	33160			
Repairs	S. Order #a278	4812			
Total Cost for Department		1123554	1123554		
CORE ROOM					
Material	Stock Record	90558			
Sundries	Journal 86	26000			
Productive Labor	Pay Roll 117	36210			
Non-productive Labor	" " 117	8450			
Repairs	S. Order #a278	3960			
Total Cost for Department		60278	60278		
CLEANING ROOM					
Expense for Tools, etc.	S. Order #a272	1460			
Labor	P. Roll 119	35920	37380		
Repairs					
Total Cost for Department		37380			
MACHINE SHOP					
Wrought Iron	Stock Record	4817			
Supplies	" "	2918			
Fuel and Light	Voucher Bk 94	7811			
Sundries	Journal 86	1219			
Productive Labor	Pay Roll 118	61250			
Non-productive Labor	" " 118	16260			
Repairs	S. Order a 278	1115			
Total Cost for Department		95353	95393		
Unclassified Labor			5140		
Factory Expense			21896		
General Expense			11416		
Net Cost of Production			1401327		1401327
Patterns and Flasks				29175	
Office Expense				26110	
Special Expense				5111	
Freight				41113	
Taxes, etc.				32360	104769
Total Cost of Operating					1506096

PRODUCTION	WEIGHT	AMOUNTS	LAST MON.
Weight Castings, Class A	2692	190 38	
" " " B	168498	2527 47	
" " " C	531501	8610 32	
" " " D	381916	6492 57	
" " " E	42111	842 22	
" " Shop	3101	20 34	
" " Special			
Total Weight Good Castings	1139819	18683 30	
Total Weight Bad Castings	48146		
Total Production			
Add Machine Work		342 22	
Add Special Jobs			
Total Value for Month		19021 52	
Deduct Cost		14013 27	
Profit or Loss		5012 25	
Net Cost		14013 27	
Per lb.		0122	
Whole Cost		15056 96	
Per lb.		0131	
Average Daily Casting Loss	1128		
Per Cent " " "	.042		
Remarks:			

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FORM 14.—COST SHEET.

ing, and should be charged against the order on which they are made, but in other respects they are the same as machinery, and the cost of new machinery is not charged against the cost of production for any particular month. Of course, the amount allowed for depreciation will be much higher than for machinery, but the principle is the same. In the opinion of the writer it is entirely wrong to charge up the cost of any pattern or patterns against the cost of production for any single month. These patterns may be expensive to make, and may be used on future orders for months or years to come, so it is manifestly unfair to charge up their cost against the month in which they were made. It is far better to treat the pattern shop as if it were a separate factory altogether, in no way connected with the actual production, and to charge it with material, labor and expense it incurs, crediting it with patterns and flasks it produces, doing this through the general ledgers, and not through the cost sheet. Figure this expense in the cost of operating for the month, but keep it out of the cost of production. In other words, treat patterns and flasks as machinery, and not as supplies.

If all the reports and records shown here have been correctly kept, the cost of production will be completely and accurately shown on the cost sheet. At the end of the year, the cost as shown by the sheet should and will exactly tally with the books of original entry. The percentage of general expense and factory expense can be derived from this sheet by dividing their amounts for the month by the footing of the "extension column."

The other section of the sheet is devoted to a recapitulation of the production for the month together with general information regarding the costs per pound, and percentages of the castings.

FOUNDRY		CORE ROOM		MACHINE SHOP		CLEANING ROOM		FACTORY	GENL. EX.
Expense	General	Expense	General	Expense	General	Expense	General		

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FORM 15.—SUNDRY EXPENSE AND MAINTENANCE.

This portion of the form may be varied to suit the requirements of the user or may be omitted altogether, but it is a useful and convenient record, and in most cases it is advisable to keep it.

Form 16 is a recapitulation of costs and values for a year or half year as desired. It is designed principally for the purpose of comparison from year to year, as well as a means of checking the cost sheets with the regular account books. It is simple in form and will not require much description. Columns are provided, showing the production, cost, value and loss or gain for each month. The loss or gain for the year will, if these records have been correctly kept, tally with that shown by the general ledgers.

The system described is devised, as stated above, more as a general guide for a foundry cost system than as a pattern to follow for any special line of foundry work, there being many portions of the entire system as well as of the separate forms which will not be at all suited to some lines of foundry work, no matter how adaptable they might be to others. But the principles we believe to be sound, these principles being to report all material and labor correctly and to obtain all other expense items from the general account books and not to guess at them, and to have the system at all times in shape to be checked with the general ledgers. This we believe to be the only practical way to operate a cost system, and the special methods shown here have all been proved sound by actual use, it is therefore offered without hesitation on the part of the writer for the use of those who wish to get up a practical cost system for their foundries.

SUMMARY OF COST SHEETS FOR

Month	Weight	Cost	Per lb.	Value	Per lb.	Gain	Per lb.	Loss	Per lb
January									
February									
March									
December									

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FORM 16.—RECAPITULATION OF COST AND VALUES.

Consul Hostetter, of Hermosillo, reports that the order issued by the president of Mexico on Dec. 30, 1905, forbidding foreigners the right to denounce mining claims in the state of Sonora and the territory of lower California has been revoked. In consequence all lands are opened for entry as formerly.

FORGING PRESSES.[1]

It is but a few years since forging presses were looked upon as suitable only for the heavier classes of work, presses of 2,000-tons power and upwards being generally used. The useful speed of working presses of this size was, to a great extent, limited by the speed with which the forging could be manipulated, and ranged generally from 10 to 25 strokes per minute. Various improvements have enabled the working speed of presses to be increased up to 60 and even to 80 strokes per minute. With speeds as high as this, presses can compete with hammers even for quite light work. Consequently, the range of the applications for which presses are suitable has been greatly extended.

The subject of forging presses can be divided into three parts: The construction of the press; the method of driving; and the work to be done under the press and the cost of production. The most usual construction consists of a cast iron or steel base with four columns supporting a steel entablature, which carries the main cylinder and the drawback or lifting cylinders. The best modern practice fits the columns with nuts both above the base plate and below the entablature. These can readily be tightened up when the whole load is on the press, thereby taking up all the stretch of the columns within the depth of the base plate and the entablature. This makes the press perfectly rigid under load, whereas, in the case of the columns with solid collars, it is impossible to tighten up the outer nuts. A great deal of movement under these circumstances takes place with every stroke of the press, and is very objectionable. The strongest form of press is the duplex cylinder press with a central guide cylinder fixed on the entablature. The two-cylinder press is considerably more expensive than the single cylinder, but for the larger powers, say from 2,000 tons upwards, the advantages gained are worth the additional cost. For presses of smaller powers, ranging from 300 up to 1,500 tons, a single cylinder press can be constructed, which is in every way satisfactory.

The system of driving which has most generally been employed in the past, and especially for the heavier types of press is by means of pumping engines. The simplest arrangement is to use a set of engines running constantly. The lifting of the press head is effected by constant accumulator pressure, the lifting cylinders being of sufficient power, both to lift the weight of the press head and to discharge the water from the main cylinder into a tank or air vessel. With this system, a speed as high as 40 strokes per minute can be obtained with presses of 2,000 to 3,000 tons power, but the pumping engines are required to be large and the consumption of steam is high. In the original Davy presses no accumulator presses were used, the lifting as well as pressing being effected by the main pumping engines, which did not run constantly, but were stopped and started as required.

Recently, improvements have been introduced with which rapid and satisfactory working is obtained, and in cases where electric power is available motor driven pumps can be used in place of steam. The use of pumping engines for driving presses is open to the objection that it is necessarily somewhat expensive in first cost, requires an amount of skilled supervision and the wear and tear is appreciable. The system of working presses by means of steam hydraulic intensifiers has been used for a long time, and has recently come into more general use, owing to recent improvements.

In dealing with work to be done under the press, for mild steel at a fair heat, a pressure of from three to five tons per square inch on the face of the tools is generally sufficient. When swages or dies, however, are

[1] An abstract of a paper read by A. J. Capron before the Cleveland (England) Institution of Engineers on March 12, 1906.

used, double these pressures are necessary. For the very hardest high speed steels, the pressure required may increase up to ten or fifteen tons per square inch, this being, however, a special case. For small forgings including such work as can be made from 8-inch square blooms or 12-inch by 6-inch flats, a press of 300 tons is sufficient for the largest forgings that are usually required. For heavy marine shafts and cranks, a 3,000-ton press is considered sufficient, and can easily deal with a 60-inch ingot.

For the heavier forgings better work can be done under the press, and more reliable forgings produced than by a hammer. It is not practically possible to have a hammer of sufficient weight to get to the center of a large ingot, the surface metal being spread, while the center of the ingot is not affected. With a press, however, the action is different and the pressure goes directly to the center of the ingot.

If there is any cavity in the ingot, forging under the press tends to close it, whereas a hammer, by spreading the surface metal, tends to enlarge it, and there can be little doubt but that pressed forgings are the soundest and most reliable.

Small presses are beginning to come into general use. With a press of good design and workmanship, only about one-half the steam required by a hammer is used. The press is far less liable to become wasteful than a hammer, which the latter invariably does through the wear of the working parts. In cost of repairs the press has a large advantage, as the wear and breakage of the working parts are small compared with hammers.

With respect to cost of the work done under hammer and press, it is difficult to obtain any comparative costs for heavy work, as the heaviest class of forgings are almost all done under presses. The cost of labor in the latter is relatively small, and generally speaking, less skilled labor is required for working a press than a hammer. Taking everything into consideration, the smaller consumption of steam, the smaller upkeep and repair cost and the much larger amount of work that can be done at a heat, the cost of work done under both large and medium sized presses is undoubtedly much less than with hammers.

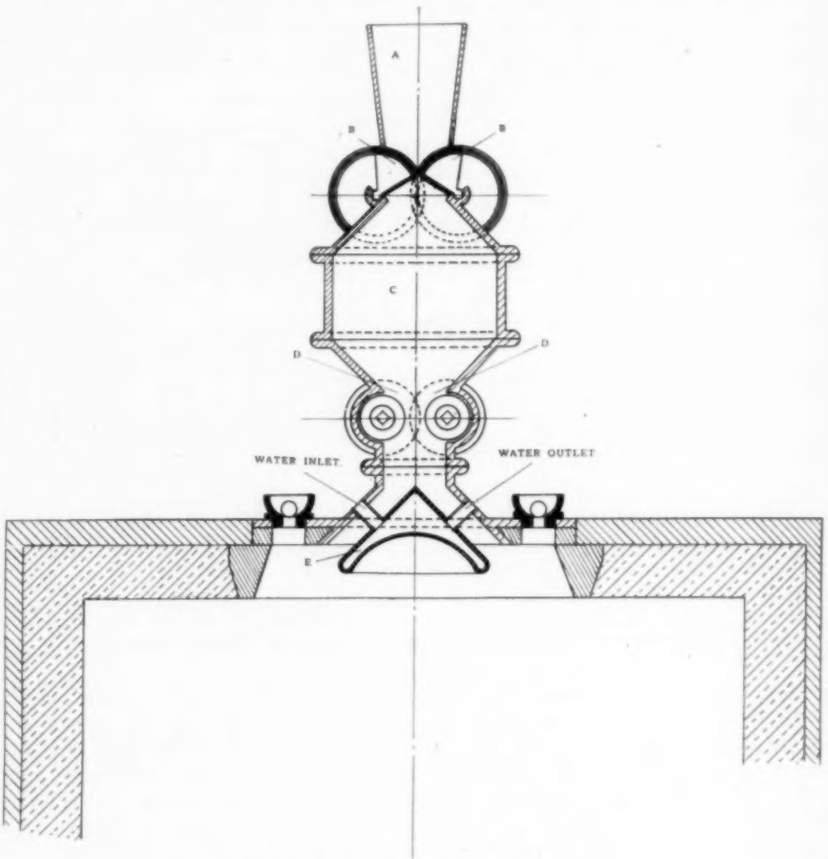
Under the direction of Edwin C. Eckel, a thorough investigation of the iron ores of Alabama is to be made during the coming summer by the United States Geological Survey. Work on the iron ore fields of Virginia, begun last year is near completion.

AN AUTOMATIC FEED FOR GAS PRODUCERS.

An automatic feed for gas producers made under the Swindell patents by the American Furnace & Machine Co., Pittsburg, is shown herewith. This automatic feed hopper is fed from the top. Coal is dropped into the hopper A, after which the double valve BB is opened and the coal dropped through to the magazine C. The coal cannot leave the magazine C, except by passing through the pair of feed rolls DD, which crush the coal and feed it down on to the water-cooled bell E, which distributes the coal evenly on the fire at all times. Six poke holes are provided in the hopper which gives access at all times to any part of the producer.

The advantages of an automatic feed for gas producers are: No gas escapes; it is much more economical than the method of dropping a hopper of coal every 10 or 15 minutes, which causes a puff of gas, and then dies down until another hopper of coal is dumped. With the automatic feed, this trouble is eliminated, and the amount of coal fed is regulated to be just the amount that the furnace consumes, and the charge will remain the same from the time the furnace is started until it is stopped. This insures a constant and regular supply of gas.

The feed rolls will not permit the admission of lumps of coal larger than three inches. This is also an advantage, as, when a large lump of coal is dropped on the fire, the full amount of gas is not obtained from it unless it is broken up at once. The automatic feed can be used on any gas producer now in use for melting, heating, welding, hardening and annealing in the largest furnace to the smallest fire, if it is built to use producer gas. Perfect combustion is obtained and smoke is prevented which also is a saving in fuel.



AUTOMATIC GAS PRODUCER FEED.

Naval Building Plans.—The house committee on naval affairs has agreed on the construction of one battleship of the largest type, estimated to be of 19,400 tonnage and to cost not more than $6,000,000 exclusive of armor and armament. In addition the program includes three torpedo boat destroyers to cost $750,000 each, the purchase of submarines to cost $1,000,000, $100,000 for beginning work on the floating steel dock at Atlantic City and sundry other minor items. The total appropriation is slightly less than $100,000,000.

DUNN TO RESUME.

OLD CRYSTAL FALLS PROPERTY PUT IN SHAPE.

Improvements Under Way at Champion Mine.—Iron Mountain Notes.

(Special Correspondence.)

Iron Mountain, Mich., April 2.—The old Dunn property, in the Crystal Falls district of the Menominee, which in years past made big money for fee-owners and operators, will re-enter the shipping list this year, and before the season of navigation ends will doubtless have forwarded a considerable tonnage. The work underground is well advanced, and on the surface good headway has been made with the program of improvements. The shafthouse capping the new shaft has been completed, and is a model; the erection of the foundation for the new engine plant is well along. The stone used in this work is being taken from the foundation of the engine house which formerly served the mine and which, being of no use to the newer workings, will be removed or demolished.

The Dunn has had an interesting history. It was the general impression long ago that the mine was pretty well worked out, yet it continued producing for many years and altogether shipped upwards of one million tons of ore. The Dunn made its first shipment in 1887. The mine was first obtained by Ferdinand Schlesinger, once the uncrowned king of the iron ore trade. It was lost by him on his failure in 1893, but he regained it three years later. The property failed to meet the expectations he had based on former records, and it was robbed of pillars and floors in 1897 and 1898, collapsing completely in the following year.

The Dunn passed under the control of Corrigan, McKinney & Co., of Cleveland, in 1899, through the purchase of the lease and plant from Schlesinger and the securing of a satisfactory arrangement with the fee owners, who saw the necessity of abating their demands in view of the time and expense required in reopening the mine, and it is just now that the property is being restored to the producing stage. The former workings were so completely caved in that they could not be taken into consideration as an asset, and it has been necessary to sink a new shaft to a depth of about 800 feet in order to reach the ore known to remain in the bottom when the mine collapsed. The new shaft is located in the footwall, avoiding the caved ground, and the vein will be mined from crosscuts.

Good Strike Reported.

In the Iron River-Stambaugh district, a churn drill in commission for Oglebay, Norton & Co., on a forty-acre tract near the Dober mine location is reported to have struck ore of good quality at a depth of ninety feet. The lens is supposed to be a continuation of the Isabella vein, in which event the prospects are favorable for the opening of another mine. Diamond drilling is in progress for Pickands, Mather & Co. on a forty-acre tract north of the Baker property. The tract is a portion of the D., M. & M. lands, some of which have been taken over by the Cleveland concern.

The miners' changing house at the Caspian property has been badly gutted by fire, entailing considerable loss both to the company and the men. The origin of the fire is a mystery, but it is of interest to note that the Caspian was the third mine "dry" to burn on the western extension of the range the past few weeks.

D. H. Campbell, a Michigan College of Mines graduate, has been appointed mining engineer for the Buffalo & Susquehanna Company in the Iron River field, where it is conducting considerable exploratory work.

Champion May Resume.

While no announcement to that effect has been made by the officials, every indication points to the decision of the Steel Corporation to restore its Champion mine, Marquette range, to the active list this season. The property has been idle ever since it was purchased along with other holdings of the Clairton company two or more years ago. The Champion is one of the two biggest mines of the range outside of Ishpeming and Negaunee, and it is one of the deepest properties in the Lake Superior iron districts as well. It was opened many years ago—in 1868—and has been a large producer, having a record of upwards of four million tons to its credit. The ores are of Bessemer grade, and of the magnetic and specular varieties. There were nearly 300,000 tons in stock when the Steel Corporation took over the property, but much of this big pile has been shipped and there is need for more. A large force of machinists has been at work at the Champion for some months past, engaged in overhauling the machinery, and lately these operations have been carried on on Sundays. It is the Champion which has a spiral shaft, the only one in the region. The introduction of the corkscrew curve in mining shafts is a novelty, the scheme of Walter Fitch, formerly superintendent, now engaged in copper mining in Utah, but the plan has been found to work. The curve was necessary to enable the shaft to follow the ore measures, and the ingenious application of an apparently impossible theory resulted in a great saving to the company. But for the deflection of the shaft it would have been necessary to have sunk at least two other shafts west of No. 7 or else to have installed an auxiliary hoist at the point of deviation or to have trammed the ore almost prohibitory distances.

The Neville Iron Co., subsidiary to the Steel Corporation's Oliver company, has taken a lease of a five-sixths interest in a forty-acre tract in Section 15, 58-19, near Buhl, Mesabi range. The property has been explored by the fee owners and is said to contain 4,000,000 tons of low grade ore. The royalty is thirty cents a ton, and the minimum output 30,000 tons a year. The one-sixth interest not included in the transaction is controlled by Great Northern interests. The product of the mine will be shipped over the Duluth, Mesabi & Northern road.

Improved Transportation.

The rolling stock of the Missabe will be increased this year to the extent of 750 steel ore cars and six consolidated-type locomotives, ordered last fall for delivery this spring. Good headway continues to be made with the construction of the western Mesabi extension of the road, and if it is desired to ship at that early date from the new mines being opened in the Bovey field the railroad will be well prepared to handle the traffic at the opening of the summer season. Half a dozen engines and 500 cars are also to be received by the Steel Corporation's Duluth & Iron Range road. On both lines much improvement work has been done throughout the winter, and with double tracks leading from mines to docks the roads are well equipped to meet the demands of the record-breaking season ahead of them.

The Cleveland Cliffs Iron Co., whose activity has heretofore been confined to the Marquette and Gogebic ranges, is pushing the preparatory work at its Crosby property, at Nashwauk, Mesabi range, with the intention of shipping to market this year much of the ore contained in the deposit. The milling system will be used, and to that end stripping and underground development are both in progress. John H. Bush, formerly cashier of the Gogebic range office of the company, is in charge of the work at Nashwauk.

Egypt has resorted to the steam-driven plow, because of the scarcity of cattle, and there is a demand for light motor-driven implements.

METRIC SYSTEM TESTIMONY.

As has been stated editorially in this issue of THE IRON TRADE REVIEW, the arguments advanced by advocates of the metric system have been the same for thirty years. When these advocates attempt to amplify their arguments, their own language shows the fallacy of their claims. Some instances prepared and commented on by Mr. S. S. Dale, are as follows: On March 1, 1906, S. W. Stratton, director of the national bureau of standards, appeared before the committee on coinage, weights and measures of the house of representatives at Washington to advocate the adoption of the compulsory metric bill. Much of this testimony consisted of explanations of the metric system, with which every school boy is familiar. That part deserves no further attention than to state that the time of law makers should not be wasted by presenting theories and statements of elementary principles, instead of facts regarding this important question of weights and measures.

Director Stratton:—"People in looking at the tables see the prefixes—deci, centi, and so on. They are perfectly natural. They are words which indicate the number of times the word is divided into tens or multiplied by tens, but they are no more used in ordinary practice than dimes, eagles and mills."

This statement evidences the erroneous impression that the long cumberson metric names are unnecessary in metric practice. The kilometer, meter, decimeter, centimeter, kilogram, gram, centigram and milligram, and other metric units are used separately for different purposes. Thus, the kilometer for lengths of cloth, the centimeter for width of cloth, the millimeter for machine work, etc.

Director Stratton:—"It must not be supposed for a moment that because it is a decimal system we cannot use halves and quarters the same as in any other system. When you go beyond halves and quarters, as for example, eighths and sixteenths and thirty-seconds, the complication is too great."

This is a practical admission that an exclusively decimal basis cannot be maintained in weights and measures. The English system can make use of either decimal or vulgar fractions, and there is, in this respect, no advantage in changing to the metric system.

Director Stratton:—"The foot was twelve inches, and that is a third part of a yard; the mile is so many feet. These relations were all adjustable, but think of the confusion and the waste of time and energy without result in translating from one of these dimensions to another. In the metric system, the astronomer who measures the distances to the stars, or the railroad builder who uses the distances on the face of the earth, or the map maker, or the man in the shop, or the man in the laboratory use the millimeter; the man in the laboratory sometimes divides this millimeter into thousandths of a meter, and then divides that into a thousand again, and that is a millionth part of a millimeter he needing such a small measurement in spectrum analysis, and yet that can be translated into the measure of distance to the heavenly bodies by simply shifting the decimal point, and that is all there is to it."

This is a gross exaggeration of the facts. The idea of jumping from a molecule to a fixed star by simply shifting a little dot may be very alluring to the director, but, he has already admitted the necessity of using vulgar fractions, which would prevent reduction by moving a decimal point. Aside from this, he ignores the fact that the use of decimals with the English system makes such a reduction possible when it is desirable, as in the case of the yard, inch, pound, ounce and grain, each of which may be divided decimally.

Director Stratton:—"Now it seems to me that it must be obvious to everyone that the system of weights and measures and the system of money must have the same base, as our system of numbers."

Our weights and measures are now used with the same base, decimal, as our system of money whenever desired, and in addition can be used with any other base that may be desired.

Director Stratton:—"I do not think there is a man in this room, and I hardly think there is one in the bureau of standards, where we are accustomed to dealing with those things, that could repeat the complete tables of our own system."

It is extremely doubtful if there is a man in the bureau of standards, who can repeat the metric tables, either as conceived in theory, or as necessity has reduced them in French practice. On this point, the following admission by a prominent advocate of the metric system may be of interest: R. P. Williams, Master in English High School in Boston, and author of books on chemistry, aggregating over 300,000 circulation, states "Even among scientists who employ it (the metric system) exclusively, there is much ignorance outside of their own special field. The chemist who knows milligrams and liters as he knows his own name has but a vague idea of hectares and steres."

Director Stratton:—"The metric system is the only one that has any show of becoming international in character. This is my personal belief."

This is the basis of the metric arguments. It is the director's personal belief that the metric system is the only system that has any show of becoming international. There is no attempt by these "scientists" to apply the really scientific method of investigation, to make calm and impartial observations of phenomena, from which to form conclusions. Instead of this, we were asked to rely on the "personal belief" of everyone whose experience has been confined to the classroom, the laboratory and the non-competitive government work-shop.

Director Stratton:—"Now, as to the bill, it is not my understanding that if the government adopts the metric system, that it will do any more than buy and sell by the meter or by the kilogram or by the liter, as it uses the corresponding units in our own system."

The director in these statements assumes the role of legal adviser, and tells the committee, most of whose members are lawyers, what this Littauer bill really means. According to him the words, "use and employ the weights and measures of the metric system" in this bill mean only "buy and sell by the meter or by the liter." They do not mean, according to him, any change in the collection of internal revenue, taxes and duties on exports, none in the tabulating of the census, the framing of specifications for government contracts, the building of warships and the other innumerable affairs of the United States government involving weights and measures. Even if the words "use and employ," do only mean "buy and sell," as according to this interpretation, the inconvenience and expense to those who do business with the United States government would be enormous.

Director Stratton:—"It might cost the government something to try this experiment. I think it is well worthy of the trial. If it does not work in the end, we can abandon it at any time."

If the experiment does not work, and the attempt is abandoned, nothing has happened except to spend the government's money without any return. Along with this reckless idea of expenditure, the weights and measures are referred to as if they were like the tariff or internal revenue rates, appearing and disappearing at the will of the law making power. The established weights and measures are among the most persistent of social institutions. The law can introduce a new system of weights and measures, but cannot abolish the old or the new either, when once established.

Director Stratton:—"The authorities of the United States mint are in favor of unifying their weights and measures. I do not see how they could feel otherwise about it. It is really ridiculous that there is such a conglomeration in the matter of weights and measures."

Mr. Lilley:—"Why don't they find it out?"

Mr. Stratton:—"I think they have."

Mr. Lilley:—"Then they have the opportunity to change. The law gives them the privilege, and why don't they make the change?"

The director here is in direct conflict with the mint officers. In the "Engineering and Mining Journal," Frederick P. Dewey, assayer of the mint, treasury department, Washington, stated under the date of April 25, 1905, the results of the investigation, which he had made at the request of the director of the mint to determine the advisability of adopting the metric system for the work of the mint, and from his statement the following paragraphs are taken:

"Under instructions from the director of the mint I recently made a careful study of what would be the practical effect of substituting metric weights for

troy weights in the every day work of the mint service. At that time, I was firmly convinced that the use of metric weights would be a great advantage, but the hard logic of the absolute facts in the case has compelled me entirely to reverse my position. The mere substitution of metric weights for troy weights, which might possibly be made under present laws, would be a great disadvantage to the service, and would require considerable increase in the mint force; while even if our entire coin system were entirely reorganized, so as to bring it into the best possible relations to the metric system which would be a most serious and difficult undertaking, the metric system would still be inferior to the troy system, requiring more labor, and be a distinct disadvantage to the service . . . The metric weights in the mint service would require the handling of from 4,000,000 to 6,000,000 more figures yearly than are now required with troy weights."

The theories of the director of the bureau of standards regarding the work of the United States mint, and the experience of the practical expert of the mint form a striking contrast. On the one hand, is the man with no exeprience, telling congress that it should compel the mint to use the metric system. On the other hand, a man of experience, telling his responsible chief that he has found the metric system to be cumbersome and impractical for the mint. One scientific and the other practical. Besides these two let the following extract from director Stratton's testimony be placed.

"The man who makes a distinction between the scientific and the practical makes a distinction that does not exist. If there is anything that is practical, it is scientific work. It would not stand for a minute if it were not practical."

To which we can all subscribe.

A study of the testimony of the director before the committee on coinage, weights and measures discloses an impassable chasm between the present bureau of standards in either science or practice.

Adds Fifth Furnace.—The Portsmouth Steel Co., Wheeling, W. Va., is adding to its plant at Portsmouth, a fifth open-hearth furnace. This will give the company four basic open-hearth furnaces and one acid furnace of fifty tons capacity each. Number five furnace will probably be completed about May 1. The company has also recently entered into a contract for a supply of natural gas for its entire works. Work on the necessary pipe lines is being pushed as rapidly as possible and by May 1 the company expects to entirely abondon coal.

A CORE CONEING MACHINE.

Most core rooms are not provided with power, and hence, if core machines are used and it is desired to introduce the coneing machine, either power must be provided, or the coneing machine must be operated by hand or foot power. If the machine is operated by hand, the operator has but one hand free to manipulate the core, and under the circumstances it is practically impossible to turn out perfect work. To

A CORE CONING MACHINE.

overcome this difficulty the foot power coneing machine shown in the accompanying illustration, has been brought out. The machine is provided with two gauges which can be set to grind the taper on the two ends of the core. The makers fit up the machine regularly to make a taper 3-16 of an inch to the inch on each side, that is, a difference of 3/8 inch in diameter between points on the core one inch apart. There have been various standards proposed for prints, but after considerable experimenting the firm manufacturing this machine has adopted in its own foundry the taper mentioned above, and a number of these machines have been sold and are apparently giving perfect satisfaction. As there are two gauges, one of them may be set for the taper at the upper end of the core, and the other for the taper at the lower end. Some foundrymen prefer to use a taper on the lower end of the core, which is one-half of that used on the upper end. The machine grinds cores on the sides of the emery wheel, while the outside diameter or face may be used for grinding tools, and will be found very handy in the core room and foundry. The machine has a capacity of handling cores from 3/8 to 2¼ inches in diameter. One of the special advantages of the machine as already mentioned, is the fact that it is operated by foot power and the operator has both hands free to manipulate the core. The machine is manufactured by the Falls Rivet & Machine Company, of Cuyahoga Falls, O., and is known as the Wadsworth foot power core-coneing machine.

HIGH GRADE CONCENTRATES.

There has lately been made in carload lots at the No. 1 mill of Witherbee, Sherman & Co., Inc., Port Henry, N. Y., from their Harmony ore, special high grade concentrates for the use of the General Electric Co. and the Monsanto Chemical Works at St. Louis. This ore was made with the regular machinery which is used every day for making what is known as "Harmony Cobbed," the only change being that finer screens were substituted, which, of course, reduced the capacity of the mill very materially.

The magnetic machine used was the belt type, built by the Magnetic Separator Co., of Troy, N. Y., which is practically an electric jig.

The various analyses of the ore made during the operation gave in iron the following: 71.57, 71.20, 71.16, 71.10 and 71.02, silica 0.89 and phosphorus 0.006, thus demonstrating that it is possible for Witherbee, Sherman & Co. to manufacture on a commercial scale, if the market price will warrant it, an iron ore which is chemically purer than any other known iron ore in the world.

The screen test of this ore was as follows: On mesh 8, nothing; on mesh 16, 3.71; on mesh 20, 10.64; on mesh 40, 44.23; on mesh 60, 13.08; on mesh 80, 8.91; on mesh 100, 7.69; through mesh 100, 11.74.

AIR FURNACE BOTTOMS IN MALLEABLE PRACTICE.

BY DR. RICHARD MOLDENKE.

At the instance of a malleable foundry where considerable difficulty was experienced in keeping the "bottom" of an air furnace in good shape, an inquiry was sent around to those malleable foundries which were known to have the furnaces. Twenty replies were received, and an interesting summary thus obtained. In order to make the information particularly valuable, there was requested the size of the heats, the number of heats made with the same bottom, the material used for the bottom, and the particulars about bottoms "coming up."

Practically all the foundries use some form of fire sand for making bottom. That is to say, a sand the silica content of which runs up very high, say over 95 per cent. Furthermore, the fluxing impurities, such as lime, alkalies, and oxide of iron, must be very low, but yet enough to just bake the sand together, or "set" it when properly fired. The method of making bottom seems to be about like this:—The sand is spread on in layers of 1 inch or more, and fired to set it. This takes about 15 minutes. About five inches are put on in this way, the process being similar to that made use of in the open-hearth furnace. In the latter case, with careful patching after each heat, a bottom should last up to 1,000 heats. In the case of the air furnace some founders preferred to take off only three heats before renewing bottom, but in each case stated that they could take off more without risk, if they chose. Other founders got from 6 to 12 heats off their bottom, and these figures seemed to cover the majority of replies. The two exceptions were as follows: The first, with a natural draft air furnace, gave an efficiency of 30 heats from the same bottom. The second case, with a production of 29 heats of 14 tons, these bottoms were made by mixing ground fire brick with the fire sand.

While the method of making bottom as above described was the usual one, there were some slight variations. Thus, several foundries made the five-inch bottom all at once. One founder uses a top dressing of core sand one-half inch thick. Another uses salt or fire clay, or both, in his fire sand. Several add ground fire brick. All concur in emphasizing the necessity of thoroughly drying out each layer before the next is put on, and especially the junction between the old and the new sand on the bottom. In case the furnace foundation should draw dampness, it is advisable to erect a concrete box for the base, and fill in with broken fire brick before building up the furnace.

The word "fire-sand" is used advisedly, for it covers a number of appellations. Thus "silica-sand" is much used, though sand itself is silica of variable purity. Then "steel-sand," "glass-sand," lake sand, etc., all coming under the general head of a sand which is refractory to a high degree.

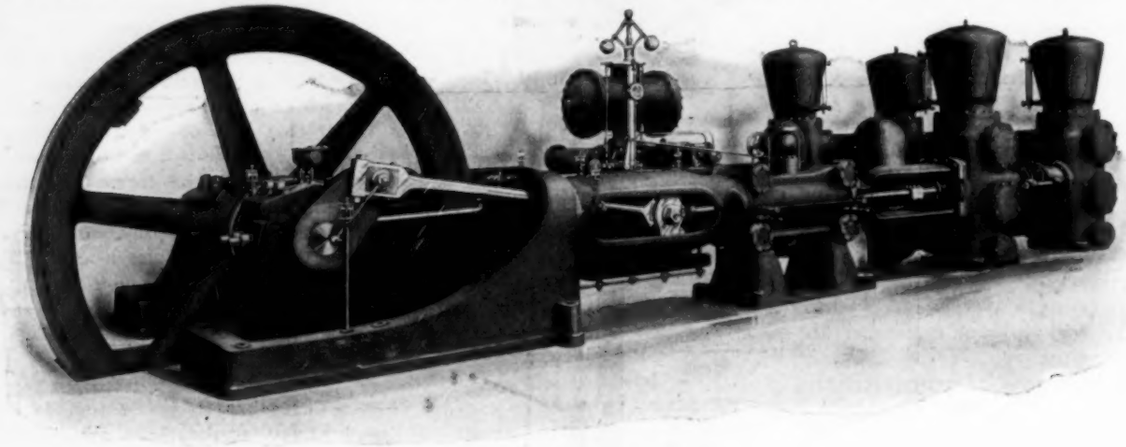
Finally the size of the heats as given by the replies to the circular inquiry are between 7 and 18 tons which would show the general practice in this respect. The further conclusion derived from this attempt to get first-hand information about a phase of foundry practice, is that more than enough in the way of a valuable return is gotten for the little trouble it took on the part of the individual foundrymen who replied, and who now have the opportunity to compare their practice with the general average.

H. J. McCune, Birmingham, Ala., has been appointed receiver for the Birmingham Engineering & Construction Co., operating a machine shop at North Birmingham. Liabilities and assets are stated as $50,000 each.

AN ECONOMICAL MINE PUMPING ENGINE.

One of the most improved types of modern mine pumping engines is now being erected at the Hull mine in northern Minnesota, which is owned by the Oliver Iron Mining Co., the mining end of the United States Steel Corporation.

The engine was designed and built by the Fred M. Prescott Steam Pump Co., Milwaukee. It is of the high duty, cross-compound, condensing, crank and fly wheel type. It is designed with special reference to underground service, and is to maintain an economical performance of 110,000,000 duty per 1,000 pounds of steam. This engine is the first of its type built by the company having the steam cylinders equipped with Corliss valve gear.



PRESCOTT MINE PUMPING ENGINE.

The steam cylinders are 12 and 22 inches diameter by 36-inch stroke. The receiver is of the reheating type, and is mounted horizontally above the low pressure cylinder. The water plungers are 8 inches in diameter, and are double acting. They are outside packed, and operate in water chambers known as the "Missabe" type. The pattern has few parts and large valve areas with direct water passages, and is capable of standing a pressure of more than double its rating. The capacity of the engine is 3,000,000 gallons against a head of 200 feet. The engine is very compact, the distance between its center lines being materially reduced by a special arrangement in the location of the eccentric rod carrier arms. A clear passage way between the two sides, however, is preserved.

A running test was made on this engine at the works of the maker on Feb. 10. The entire machine was connected, and set up on the erecting floor without any further foundation support or contact to steady its motion other than that of its own dead weight, and

the proper relative proportions of its moving and stationary parts. The suction and discharge pipes of the pump were run to a large tank built for the purpose beneath the floor level. The exhaust was led into a condenser, and a steam pressure of 120 pounds was used. The engine started without the least jar or undue motion. After a few minor adjustments had been made with the pump end in full operation, the engine was run up to 65 revolutions per minute, which is about 30 per cent over its proposed normal speed. It was kept running under these conditions for some time, and showed no apparent signs of uneasiness. A test on the range of regulation showed the cut-off and trip motion of the Corliss gear to be under full control of the governor from the lowest anticipated speed to the highest. A temporary pressure of twice the normal head was exerted on the water end.

The Prescott Co., which has always made a specialty of mine pumping machinery, at present is building two cross-compound pumping engines for the city of Denver, Col., two for the Cudahy Packing Co., at Sioux Falls, Ia., one for the same company at its South Omaha, Neb., plant, and another for the city of Mitchell, South Dakota.

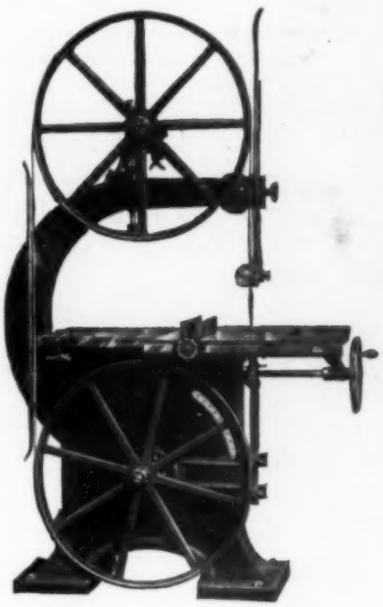
The Atlas Machine Co., Waterbury, Conn., organized within the last few weeks will occupy a building at No. 47 Canal street of that city. The new concern is capitalized at $10,000 of which $6,000 has been paid in. The officers are: President, Alexander W. Limont, for more than twenty years master mechanic of the Waterbury Brass Goods Co.; treasurer, Adam Callan, several years foreman for the Waterbury Machine Co.; and secretary, Andrew Gardner, for more than sixteen years foreman at the Waterbury Farrel Foundry & Machine Co. works. All are natives of Glasgow, Scotland, and all are well known in machinery circles of New England. The firm will build special and standard machines, metal and wire working machinery, and carry on general repairs and jobbing.

Westinghouse Electric Co. Doubles Capital.—At a special meeting of the stockholders of the Westinghouse Electric & Mfg. Co. held at East Pittsburg on March 26, an increase in the capital stock from $25,000,000 to $50,000,000 was authorized. The stockholders also ratified the action of the board of directors in issuing $15,000,000 convertible gold bonds of $1,000 each. The next annual meeting has been set for the fourth Wednesday in July next.

THE CRESCENT ANGLE BAND SAW.

A band saw on which the table is always level, but which admits of tilting the saw for bevel work is built by the Crescent Machine Co., Leetonia, Ohio. It is shown in the accompanying illustrations.

All the parts are automatic, and no adjustments are necessary in changing the angle of the saw. This operation is accomplished by turning the hand wheel at the side of the table until the pointer indicates the desired angle on the graduated quadrant on the pedestal. This may be readily done with the saw in motion. The weight of the upper part of the machine is properly counterbalanced, and the hand wheel thus turns easily. The location of the drive pulley is not changed when the machine is tilted, and, therefore, there are no complications introduced in belting up the tool.

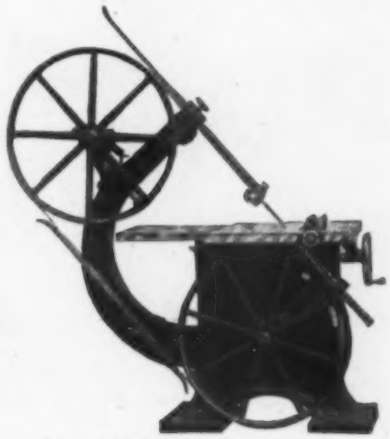


CRESCENT BAND SAW VERTICAL.

The table is carried back on the pedestal in exact unison, so that the saw always keeps its proper position in the saw-slot. Both the upper and lower guides keep in exact alignment with the saw, and the lower guide keeps at a proper distance from the under side of the table. The tension of the saw is not changed when the angle is varied.

The arm is hinged to the pedestal in a very rigid manner, by means of a heavy trunnion concentric with the lower shaft. This makes the machine as rigid when tilted as when erect. The bearings for the lower shaft consist of solid bushings fastened into the trunnion. They are provided with an oil chamber, and are practically dust proof. The upper bearing is made for a revolving shaft running in adjustable bearings instead of with a loose pulley.

The table slides on the planed ways of the pedestal, and is provided with a steel gib for taking up possible wear. The saw can be tilted backward to an angle of 45 degrees, a stop being provided at that point. It may also be tilted forward to an angle of 4 degrees. The stop on the end of the angle can be moved out of the way, however, if desired, and the saw allowed to tilt to a greater angle. The machine is provided with a number of special features, such as spring tension, counterbalanced guide-bar, hollow cored-out frame, etc.



CRESCENT BAND SAW TILTED.

Some of the dimensions are as follows:

Size of band wheels	36 x 2 inches.
Distance clear between saw and arm	36 inches.
Clear height under guide when raised	18 inches.
Size of table	28 x 34 inches.
Height of table from floor	41 inches.
Revolutions per minute	400 to 450
Floor space over all when erect	40 x 63 inches.
Height over all	95 inches.
Net weight	1,650 pounds.

Steel Frame Buildings in England.—Steel frame construction is making little headway in London. Antiquated building laws are responsible for it. It is required that the thickness of external and party walls shall follow certain schedules based upon the heights of the buildings to be erected. For a building 120 feet high the first story must have a thickness of 34½ inches; second and third, 30½ inches; and so on, until the top floor has a wall 13 inches thick. This results in taking up a large amount of valuable space and completely nullifies one of the main reasons for the modern type of construction. The use of these extremely thick walls is very expensive and has little to commend it.—*Construction News.*

AN IMPROVED MILLING MACHINE AND A SENSITIVE DRILL.

In the accompanying illustrations are shown some improved machines built by the Fox Machine Co., Grand Rapids, Mich. Figs. 1, 2, 3 and 4 illustrate the No. 3½ milling machine and a vertical milling attachment for it, while Fig. 5 shows the style B single spindle sensitive drill press.

The No. 3½ miller is not entirely new, but a great many features of it are of recent design. Among these may be mentioned a slight change in the feed mechanism, by which the crank for the hand rack feed is thrown to the left. A ratchet lever for the hand feed has been substituted for the ordinary type of lever heretofore used, and which was the style ordinarily used on this type of work. A new style of spindle construction is used, which is a radical change, and which is shown in Fig. 4. Both the front and the rear bearings are of hard bronze, and each box is independently adjustable. A steel collar is provided for adjusting the boxes, and has no other mission than to locate them in position. The main spindle bearing is two inches diameter, the driving cone is fitted tight to the spindle, and all the thrust is carried on the rear taper bushing. This in reality is a part of the main column, the thrust being transmitted through the medium of the driving cone. This construction obviates any necessity for removing the customary washer at the nose of the spindle, and turning the latter down in order to adjust the front box. The enclosed felt washer at the nose protects the bearings from dust and grit, which might be floated into the bearings by the oil used. When desired differential back gearing is placed inside the main cone pulley, which is a compact, convenient and strong arrangement. No additional gears are exposed, on account of the back gearing, the ratio of which is 4 to 1.

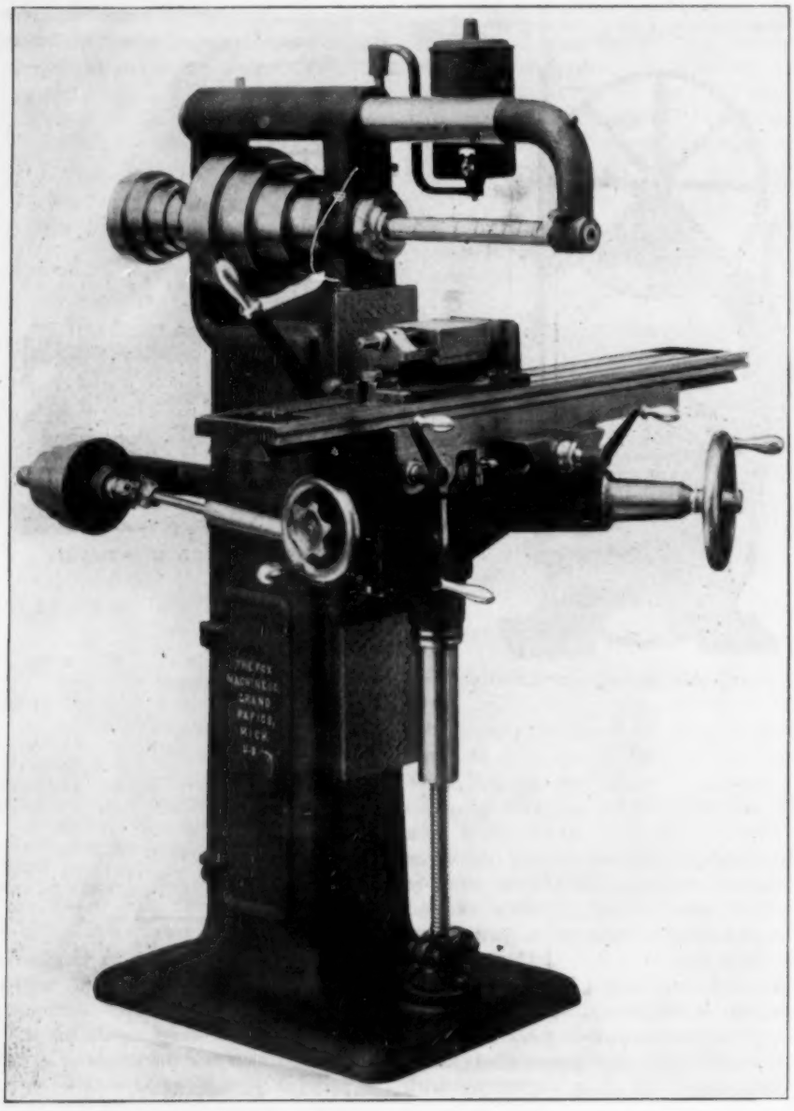


FIG. 1.—NO. 3½ IMPROVED FOX MILLING MACHINE.

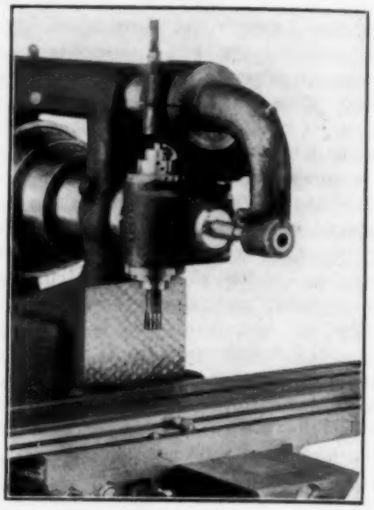


FIG. 2.—FOX VERTICAL MILLING ATTACHMENT.

Figs. 2 and 3 show a vertical milling attachment for this machine, which is entirely new. A noticeable feature is that it provides for adjustment transversely, that is, in a line with the main spindle which will swivel through an arc of 90 degrees from vertical to horizontal, and by reversing it upon the spindle and overhanging arm, it will swivel between the vertical and horizontal on the opposite side. This enables the operator to cover a full 180 degrees. A graduated dial provides

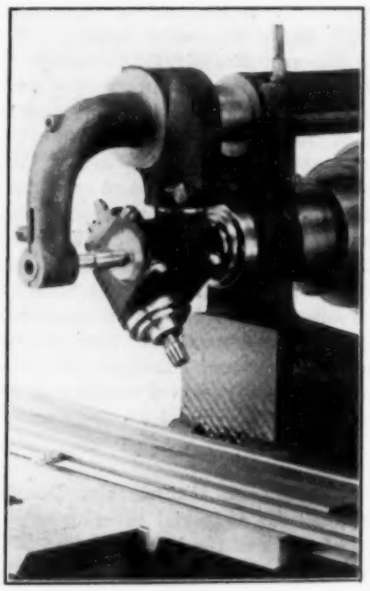


FIG. 3. FOX VERTICAL MILLING ATTACHMENT SET TO MILL AT AN ANGLE.

for conveniently setting it at any angle. The spindle is extra heavy, and is provided with a draw in bolt for collets and mills. The spindle has a No. 7 Brown & Sharpe taper. A hole of

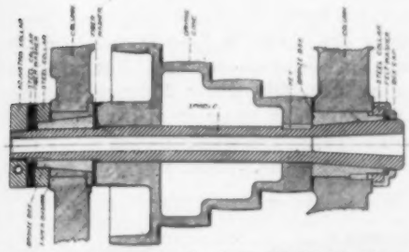


FIG. 4.—SPINDLE OF FOX MILLING MACHINE.

½ inch diameter is provided through its entire length. The attachment is made so rigid that its efficiency is just as

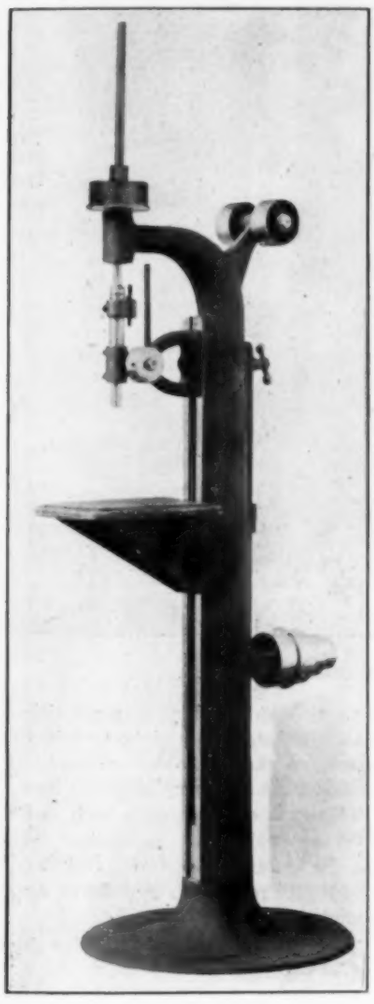


FIG. 5.—FOX SENSITIVE DRILL PRESS.

great as a vertical miller as it is when used as a horizontal machine.

The following are some of the dimensions of the complete milling machine:

Longitudinal movement automatic in either direction	24 inches
Tranverse movement	6 inches
Vertical movement	14½ inches
Working surface of table	6 x 30 inches
Over all size of table	6 x 30 inches
Number of feeds	6
Feed per revolution of spindle	.003 inch.
	.005 "
	.006 "
	.007 "
	.00 "
	.010 "
	.014 "
Number of spindle speeds	24
Range of spindle speeds	24 to 425
Floor space required	44 x 61 inches

The drill shown in Fig. 5 is known as the style B single spindle sensitive drill. The principal features are a very strong one-piece frame casting with a base 24 inches in diameter. The table has a 26½-inch vertical adjustment, and an improved type of spindle and spindle bracket construction. Three changes of speed are provided. The spindle is counterbalanced by a quick acting spring, and a spindle bracket is clamped by a straight pull from the back instead of from the side. Consequently, there is no tendency to spring the spindle out of line. Extra heavy long removable bushings are used on the upper cone bearing. An adjustable collar on the spindle sleeve provides an accurate depth gauge. The table has a convenient oil groove around the edge, and is conveniently locked in position by an eccentric clamp lever, which gives it a quick and positive action. Some of the dimensions of the drill are as follows:

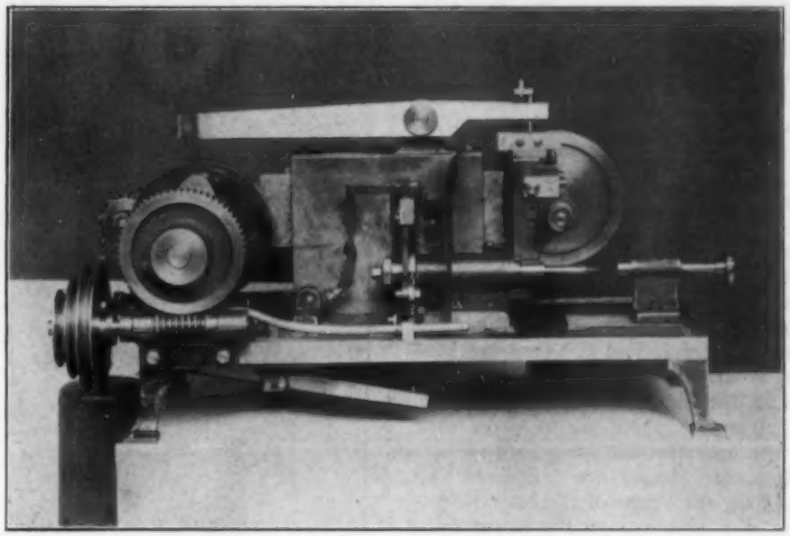
Size of table	8 x 12 inches
Maximum distance between spindle and table	33½ inches
Diameter of spindle	⅞ inch
Movement of spindle	4 inches
Vertical movement of spindle bracket	10 inches
Floor space occupied	24 x 30 miles
Net weight	260 pounds

The Seneca Transportation Co., Buffalo, N. Y., has been incorporated, it is stated, in order to care for the lake shipping interests of the Lackawanna Steel Co. Directors of the new company are: Lackawanna officers, with George W. Smith as superintendent.

AN AUTOMATIC GEAR CUTTER.

The accompanying illustration shows an automatic gear cutter recently developed by the Standard Mfg. Co., of Bridgeport, Conn., on which a patent has been applied for. The machine is designed to meet a demand for rapid production at low cost, and is especially adapted for making small bevel gears, pinions, spur gears, etc., to four inches diameter, and for cutters of irregular shapes. It will cut teeth in single blanks, or in gangs, up to two inches in length.

The construction is extremely simple, and owing to this fact, it can be run at a high speed without vibration or noise. Two changes of speed are



STANDARD MFG. CO'S AUTOMATIC GEAR CUTTER.

provided for the cutter spindle and nine changes for the feed mechanism. Both spindles have heavy taper bearings with compensation for wear. The cutter works nine-tenths of the time, being raised clear of the work on the return stroke, the indexing, which is positive, being accomplished at the same time. The motion of the ram which carries the cutter is controlled by a cam, which is quickly and easily changed, as desired. Cams can be furnished for any length of throw, up to 2½ inches.

The operation of the machine is as follows: The blank to be cut is mounted on the spindle passing through the headstock. The spindle, passing through the tailstock, is provided with a nut for locking the blank in place, this nut being run on the thread, shown on the end of the spindle. In the illustration, no gear blank is shown. The machine is driven by a three-step cone-pulley, which is thrown in gear by means of a clutch operated by a rod on the front, and parallel to the base plate. This pul-

ley drives, through means of a worm and worm wheel, a cam mounted on the same spindle as the worm wheel.

A slide is mounted in the large block, at the back of the machine, and is driven forward by the cam on the end of the worm wheel shaft. This slide carries the revolving cutter, mounted on the spindle in the head at the end of the slide, and the whole arrangement is carried forward while the cutter is passing through the blank. When the cut is completed, the lever mounted on the top of the block carrying the slide drops into a notch in the cam, mounted on the worm wheel shaft, on which it rests while the cutter is in motion. Two powerful helical springs, not shown in the illustration, then raise the cutter clear of the work, and the slide is drawn back by the heavy counterweight, which is seen immediately below the cone pulley. This operation is so timed that as soon as the cutter is clear of the blank, the cam which controls the indexing mechanism operates, while the main slide is being drawn back to its starting point. The indexing is done through a train of gears shown at the end of the headstock When the work has made a complete revolution, the feed mechanism is tripped by means of a small pin in the side of the indexing plate, and irregular parts are in plain view of the operator.

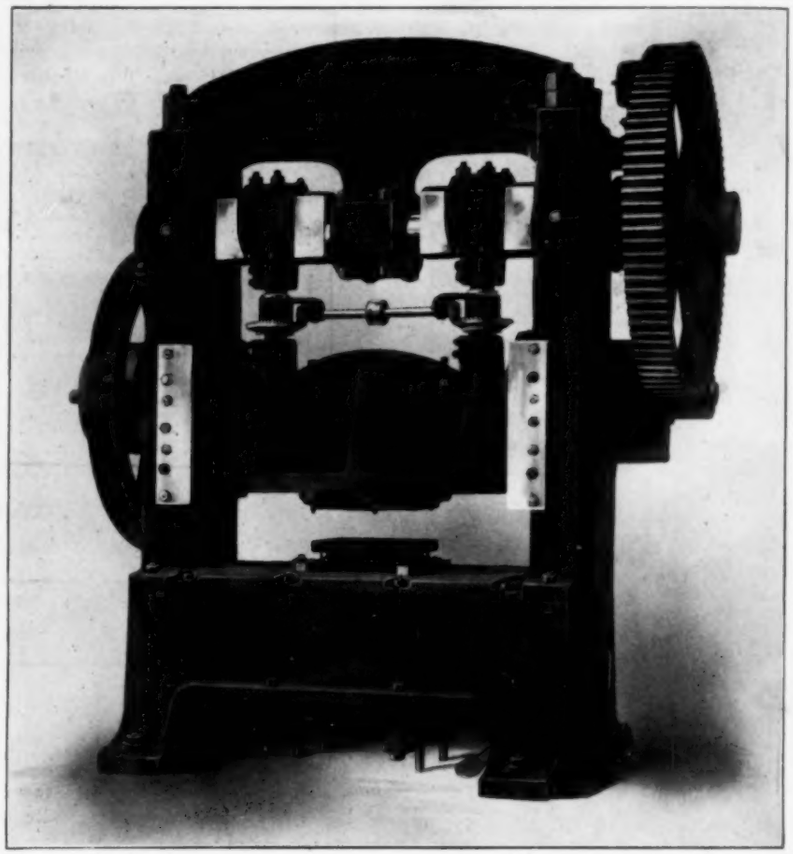
Irregular shapes are obtained by changing the shape of the interchangeable cam, mounted on the cutter spindle slide. This cam is underneath the end of the lever, which raises the cutter clear of the work.

TRADE WITH MEXICO.

In the trade of the United States with Mexico during 1905, which aggregated in value $92,000,000, the iron and steel manufactures played an important part. Exports of these articles to Mexico aggregated over $12,000,000 and coal and coke exports were about $4,000,000. Of the imports from Mexico copper in ore or in pigs, bars and ingots was valued over $15,000,000 against less than $500,000 in 1895. This last importation was chiefly for the purpose of subjecting the copper to smelting and refining processes and extracting the precious metals which it contained. For the same reason lead imports were last, aggregating about $3,250,000 in 1905. Consular estimates are that fully a half billion dollars of capital of the United States is now invested in Mexico, Canada and Cuba, about one-half of this being in Mexico. Trade with Mexico has trebled during the last ten years.

STAMPING AND EMBOSSING PRESS.

The large geared stamping and embossing press shown in the accompanying illustration is built by the A. Garrison Foundry Company, Pittsburg, Pa. It is used in the manufacture of the following: steel furniture, armature discs, steel wheelbarrows, steel sinks, tool trays, shop trays, automobile parts, break beams, steel ties, steel fence posts, extra large embossing and blanking hammers, steel gas ranges, steel stoves and ranges, galvanized tin ware, enamel ware.



GARRISON STAMPING AND EMBOSSING PRESS.

The machine as shown with combination drawing dies is arranged with a special spring plate under the bolster plate and is adjustable from the outside, and will take any work up to the limit of the press. It is further provided with extra long adjustment of slide and long gibs, also long stroke The main gear is machine cut from solid cast iron blanks, and the pinion is cut from a solid open-hearth steel forging. The large gear is bronze bushed. The clutch is of the automatic sliding block type.

The base and legs are made in one piece, and the arch is extra deep and strong. The entire frame is securely held together with four very large stay bolts passing down through the arch uprights and base, with jam nuts at the top and bottom. Large dowel pins and keys are used to prevent the machine from shifting. It will be seen that it is almost impossible to break a machine of this type.

The lower boxes in the main bearings are securely held in position by means of steel wedges. The slide is the full width of the distance between uprights, and there is a large opening through each housing so the press can be used on very long work by passing the article to be cut or stamped through these openings from right to left. The frames of these presses are made of a special high grade of charcoal iron.

This type of machine is built in forty different styles and sizes, best suited for the different purposes, and varying in weight from 5,000 pounds to 200,000 pounds.

The dimensions of the machine shown are as follows:

Weight, 40,000 pounds.

Distance between uprights, 60 inches.

Distance bolster to slide, with stroke up and adjustment down, 16 inches.

Stroke of slide, 8 inches.

Proportion of gearing, 8 to 1.

Opening in bed, 32 x 48 inches.

This latter dimension can be changed, if so desired.

Stocks Advance in Quiet Market.

The stock market of the past week was one of moderate activity with trading healthy and the trend of prices strongly upward. Almost every security dealt in to any extent closed the week with a net gain, in some instances of several points. Iron, steel and manufacturing stocks enjoyed a considerable share of prominence and netted some good advances. The steel issues sold a total of 460,000 shares and closed almost two points higher than on the previous Saturday. Colorado Fuel & Iron was one of the market leaders and was dealt in to the extent of 215,000 shares. Reading, Union Pacific and the copper stocks played an important part in the trading of the week. News conditions were not entirely favorable for an advance. Money continued tight and rates were relatively high, though the announcement of preparations for importing gold from Germany strengthened the situation slightly. The peaceful settlement of the diplomatic tangle in Morocco removed another possible element of danger and April dividend payments released something in the neighborhood of $65,000,000. But the outcome of the struggle in the mining districts was the feature of chief interest and dominated the market. Its uncertainty kept the steel stocks in comparative quiet during the early part of the week and sent them upward in the closing days when it seemed certain that the bituminous strike would not be general and that the Pittsburg district would largely be exempt. Pittsburg Coal was a leader on the Pittsburg exchange, doubtless because of its announced attitude on the question of granting the miners' demands, and the preferred made a remarkable gain, equaling the high record of the year. Despite its depressing features, the week developed a better tone of trading than had prevailed for the past fortnight and manifested unexpected strength.

FINANCIAL NOTES.

Recent dividend declarations include the following: Chicago Pneumatic Tool Co., regular quarterly, 1 per cent, payable April 25; E. W. Bliss Co., regular quarterly, 2½ per cent on preferred and 2 per cent on common, payable April 2; American Rolling Mill Co., regular quarterly, 1½ per cent, payable April 15; Tennessee Coal, Iron & Railroad Co., regular quarterly, 1 per cent.

Shareholders of the Barney & Smith Car Co. will vote April 10 on the proposition to issue $2,000,000 bonds and $1,000,000 additional stock.

The annual report of the United Shoe Machinery Corporation for the year ending Feb. 28, shows earnings of $3,250,000, or 16 per cent on the common stock, by far the largest in the company's history. The Beverly plant was operated day and night to handle the new business offering, and is being enlarged about 60 per cent. Earnings of the foreign companies were unusually large.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quotation March 24	Closing Quo. March 31	Changes	Date of 1906 Ann. Meet.	Par Value	Capital Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Dec.
Allis-Chalmers Co	21¼	22	+ ¾	Sept.	100	19,820,000		.....	.....
Allis-Chalmers preferred	58	58½	+ ½		100	16,150,000	7 cum	.....	Feb., 1904
American Can	9¼	9⅛	− ⅛	Apr. 24	100	41,233,300		.....	.....
American Can preferred	66	66⅞	+ ⅞		100	41,233,300	7 cum	5 Q.	Apr., 1906
American Car and Foundry	41¼	45½	+3⅞	June 28	100	30,000,000		.....	May, 1905
AmericanCar and Foundry preferred	101⅛	102¾	+1⅝		100	30,000,000	7 n. c.	7 Q.	Jan., 1906
American Locomotive	68⅛	69	+ ¾	Oct. 16	100	25,000,000		.....	
American Locomotive preferred	.....	115½	.....		100	24,100,000	7 cum	7 Q.	Apr. 1906
American Shipbuilding	56½	55½	−1	Oct. 2	100	7,600,000	4	4 Q.	Apr., 1906
American Shipbuilding preferred	108	108	.....		100	7,900,000	7 n. c.	7 Q.	Jan., 1906
American Steel Foundries	12¾	12⅝	− ⅛	Oct. 3	100	17,700,000		.....	
American Steel Foundries preferred	45⅝	46¼	+ ⅝		100	17,700,000	6 cum	.....	Aug., 1905
Barney & Smith	49	51	+2	June 5	100	1,000,000		.....	June, 1894
Barney & Smith preferred	150	150	.....		100	2,500,000	8 cum	8 Q.	Mch., 1906
Bethlehem Steel	26	28	+2	April 3	100	15,000,000		.....	
Bethlehem Steel preferred	85	85	.....		100	15,000,000	7 n. c.	7 Q.	Feb., 1906
Bullock Electric preferred	114	114	.....	Oct. 2	100	1,000,000	6	6 Q.	Jan., 1906
Cambria Steel	35½	36	+ ½	March 20	50	45,000,000	6	7 Q.	Mar., 1906
Cambria Iron	49½	49½	.....		50	8,468,000	4	4 S. A.	Apr., 1906
Colorado Fuel & Iron	62⅞	66⅝	+3¾	Oct. 15	100	30,132,000	7	.....	Apr., 1902
Wm. Cramp & Sons Ship & Eng. Bldg. Co.	24	24	.....	May 31	100	6,098,000	5	.....	Nov., 1902
Crucible Steel	14½	14⅜	− ⅛	Oct. 17	100	25,000,000		.....	
Crucible Steel preferred	78½	79⅛	+ ⅝		100	25,000,000	7 cum	.....	Sept. 1903
Empire Steel	8	8	.....	Feb. 28	100	2,281,400		.....	
Empire Steel preferred	38	38	.....		100	2,500,000	6 cum	3 S. A.	Jan., 1905
Fay & Egan	93½	93½	.....	Feb. 20	100	1,000,000	5	5 Q.	Nov., 1905
Fay & Egan preferred	128½	128½	.....		100	1,000,000	7 cum	7 Q.	Nov., 1905
General Electric	168½	172¾	+3¾	May 8	100	48,256,050	8	8 Q.	Jan., 1906
International Pump	33	38	+5	June 5	100	12,262,500		2	July, 1905
International Pump preferred	84	83¾	− ¼		100	8,850,000	6 cum	6 Q.	Feb., 1906
Lackawanna Steel	75	75	.....	March 14	100	34,971,400		.....	
Lake Superior Corporation	19	19	.....	Oct. 3	100	40,000,000		.....	
Niles-Bement-Pond	125	128	+3	Feb. 7	100	5,000,000	6	6 Q.	Feb., 1905
Niles-Bement-Pond preferred	105	105	.....		100	2,000,000	6 cum	6 Q.	Mch., 1906
Otis Elevator Co	.....	56	.....	March 19	100	6,350,300		2 A.	Apr., 1906
Otis Elevator Co. preferred	.....	100	.....		100	5,589,500	6 n. c.	6 Q.	Apr., 1906
Pittsburg Coal Co	14⅝	15	+ ⅜	Feb. 12	100	30,135,000		.....	
Pittsburg Coal preferred	55½	61⅛	+5⅝		100	30,716,200	7	.....	Apr., 1905
Pressed Steel Car	52½	53¾	+1¼	Feb. 21	100	12,500,000		3	Aug., 1904
Pressed Steel Car preferred	97½	98⅛	+ ⅝		100	12,500,000	7 n. c.	7 Q.	Feb., 1906
Pullman Palace Car	238	239	+1	Oct. 18	100	74,000,000		8 Q.	Feb., 1906
Railway Steel Spring	55½	56¾	+1¼	March 1	100	13,500,000		4 S. A.	Oct., 1905
Railway Steel Spring preferred	103	102¾	+ ¾		100	13,500,000	7 cum	7 Q.	Apr., 1905
Republic Iron & Steel	29	31⅞	+2⅞	Oct. 17	100	27,352,000		.....	
Republic Iron & Steel preferred	99¾	102¾	+2½		100	20,852,000	7 cum	7 Q.	Apr., 1906
Sloss-Sheffield	79½	84⅞	+5⅜	March 14	100	7,500,000	5	5	Jan., 1906
Sloss-Sheffield preferred	112¾	112¾	.....		100	6,700,000	7 n. c.	7 Q.	Jan., 1906
Tennessee Coal & Iron	149½	149	− ½	May 15	100	22,552,800		4 Q.	Apr., 1906
U. S. Cast Iron Pipe & Foundry	46⅜	49¼	+2⅞	June 27	100	12,500,000		2	Jan., 1906
U. S. Cast Iron Pipe & Foundry preferred	91⅜	92⅜	+1		100	12,500,000	7 n. c.	7	Feb., 1906
U. S. Steel	39⅞	41¾	+1⅞	April 16	100	508,302,500		.....	Dec., 1903
U. S. Steel preferred	105⅝	107¾	+1⅛		100	360,281,100	7 cum	7 Q.	Feb., 1906
U. S. Steel 5's	98¼	99	+ ¼		100	463,798,000	5	5 A.	
Virginia Iron, Coal & Coke	46	46	.....	Sept. 18	100	8,641,600		.....	
Westinghouse Electric	161	158	−3	June 27	50	20,996,350	10	10 Q.	Apr., 1906
Westinghouse Air Brake	156	154	−2	Oct. 2	50	10,990,450	20	20 Q.	Apr., 1906

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The Reliance Mfg. Co., St. Paul, Minn., has been incorporated with a capital of $200,000 to manufacture steel and iron. The incorporators are: C. W. Barber, Red Wing; Howard T. Eachus, St. Paul, and Walderman Erickson, Minneapolis.

The Progress Engineering Co., Brooklyn, has been incorporated with a capital stock of $125,000 to construct appliances for high pressure water supply. The incorporators are: Joseph S. Anthony, Brooklyn; Wallace P. Groom, 486 Jefferson avenue, Brooklyn, and Charles E. Lewis, Lynn, Mass.

The Crescent Foundry Co., Des Moines, Ia., has been organized with a capital stock of $25,000 to take over the plant of the Purington Mfg. Co. The incorporators are: H. R. Hewell, W. V. Wilcox and W. B. Starkey.

The Andrews Pressed Metal Mfg. Co., Elgin, Ill., has been incorporated with a capital of $250,000 to manufacture pressed steel articles by a process invented by John K. Andrews, 414 DuPage street, Elgin, one of the incorporators of the company. The others are: Charles H. Stowe, James W. Legate and George D. Silliman, all of Elgin.

The Wertheimer Iron & Metal Co., Dallas, Tex., has been incorporated with a capital of $10,000. The incorporators are: S. Wertheimer, Sam Freshman and Ed. I. Dreeben.

The Wilson Stove Mfg. Co., St. Louis, Mo., has been incorporated with a capital of $500,000. The incorporators are: James Wilson, James B. Wilson and Stephen B. Long.

The New England Steel & Copper Plate Co., New Britain, Conn., has been incorporated with a capital of $20,000. The incorporators are: Thomas E. Elliott, New Haven; William W. Penfield and Le Roy W. Penfield, of New Britain.

The Kenney Machinery Co., Indianapolis, Ind., has been incorporated with a capital of $30,000. The incorporators are: Edward T. Kenney, A. C. Hyres and Margaret Kenney.

The Standard Heating Co., Des Moines, Ia., has been incorporated with a capital of $15,000 to manufacture the Armstrong furnace. The incorporators are H. E. Armstrong and Loring Stanley.

The Copley Machine Co., Fostoria, O., has been incorporated with a capital of $10,000 by N. G. Copley, H. S. Linhart, Frank A. Copley, Charles C. German and M. M. Carr.

The Central Foundry Co., Muskegon, Mich., has been organized by John Richardson and Edward Meyer to do a general jobbing business in gray iron castings.

The Skinner Shipbuilding & Drydock Co., Baltimore, Md., has been incorporated with a capital of $800,000 to carry on a general shipbuilding and drydock business, the manufacturing of machinery and the development of novelties and inventions. The incorporators are: William L. Fawls, Henry M. Marshall, William W. Powell and Walter E. Thompson, all of Baltimore; Charles C. L. Horsey, of Frederick county; William P. Constable, of Cecil county, and George W. Taylor, of Baltimore county.

The Rhodes Metallic Packing Co., Galveston, Tex., which was incorporated for $36,000 the last of January, has opened up for business with temporary offices at 208 Tremont. The company will manufacture a new kind of piston rod and steam valve packing. The incorporators are: H. P. Rhodes, L. Rhodes, R. P. Clark, E. N. Sanctuary and B. K. Crowels.

The firm of Ammons & Goan has been established at Knoxville, Tenn., by John T. Ammons, M. A. Ammons and others, who will operate a stove foundry costing $10,000.

The Charleston Sheet Metal Works, Charleston, W. Va., was recently incorporated for $20,000, with J. R. Shanklin as president, W. G. Barran, treasurer, and Chas. Skiba, general manager. Hot air furnaces, sheet metal work, cornice and roofing will be manufactured.

The Olcott Coal & Iron Co., Charleston, W. Va., recently incorporated for $50,000 is to develop a 6,000-acre tract of coal lands in Kanawha county, as well as iron ore lands in adjacent properties. R. Morgan Olcott is president, and A. DeCosta Gomans, secretary and treasurer, both of New York.

The National Iron Mining Co., St. Louis, Mo., has been incorporated with $50,000 capital stock by Wm. Ferguson, George W. Wheeler and J. P. Thomas.

The Virginia Pipe & Foundry Co., Richmond, Va., has been organized with $50,000 capital stock with Thomas S. Speelwright as president, and W. R. Wayt, secretary and treasurer. The McClintic-Marshall Construction Co. has the contract for a steel building 125 x 150 feet for this company, which will manufacture cast iron soil pipe.

The North American Steel Co., Belington, W. Va., has been incorporated with $1,250,000 capital stock by Grant C. Groomall, Harvey Hatch, C. R. Rusk, of Belington; Sam M. Nease, of Weston, W. Va., and David A. Nease, of St. Louis, Mo.

The Jones & Hopkins Mfg. Co., Nashville, Tenn., has increased its capitalization from $50,000 to $100,000, and will erect a foundry building 90 x 185 feet.

Ballou's White Sand Co. has been organized, with a capital stock of $10,000, to develop a 25-acre deposit of white sand at Millington, Ills., and will begin shipping about April 20.

The Stehlin-Miller Co., New York, has been incorporated with a capital stock of $10,000 to manufacture engines, machinery, tools, etc. The incorporators are: Charles V. Stehlin, No. 162 East 93d street; Martin Paskus, No. 22 East 89th street; Arthur B. Hyman, No. 113 West 87th street, all of New York.

The Ideal Automatic Pump Governor Co., No. 15 Exchange Place, Jersey City, N. J., incorporated with a capital stock of $15,000, will manufacture pumps, engines, governors, etc. The incorporators are: William E. Nye, U. S. Transport Sumner, foot of 56th street; Charles P. McMullen, No. 765 Halsey street, both of Brooklyn; and Richard F. Tully of the address given.

The Whitehall Contracting Co., New York, has been incorporated to carry on a brass foundry and manufacture engines, machinery, etc. The capital stock is $5,000 and the incorporators are: Stacy R. Hills, No. 266 84th street, Brooklyn; Thomas L. Rolls, No. 23 South Arlington avenue, East Orange, N. J.; John W. Dunn, No. 123 Liberty street, New York.

The Devolute Machine Co., New York, mechanical engineers and machinists, has been incorporated with a capital stock of $30,000. The incorporators are: John V. McAdam, No. 42 Broadway; Charles J. Everett, No. 346 Broadway; and Franklin A. Wagner, No. 34 Nassau street, all of New York.

Johnstown, Pa., capitalists have incorporated a company to establish and operate a large forge plant, with a specialty of street car forgings and automobile parts. The incorporators are: John H. Waters, of the National Radiator works, R. Purlie Smith and Curt G. Campbell. Associated with them are James M. Shumaker, E. B. Entwissel, W. Milton Brown, former Sheriff Geo. M. Wertz, and John M. Rose.

New Construction:—

Negotiations are under way for the construction of a large furnace at Hamilton, O. E. L. Phillips, formerly superintendent of the Kelly Iron & Nail Co., Ironton, O., is interested with Frank Whitaker, president of the Miami Valley National bank, and others. A site has been decided on near the Hamilton Coke Otto Works, from which it is proposed to secure the coke. Plans are for a 250-ton furnace, which, it is stated, will be completed in about a year.

The Vulcan Iron Works, Seattle, Wash., is planning the erection of an extensive plant for the manufacture of mining and other machinery, supplies and engines and boilers. The plant will include machine shops, foundry, pattern shops, forge shops, rolling mills, etc. A large amount of new machinery will be required. H. P. Strickland is secretary and treasurer.

The New Phoenix Foundry & Machine Co., Springfield, Mo., now has under way four new structures, each 50 x 70 feet, a foundry, machine shop, blacksmith shop and boiler shop. Considerable new equipment will be purchased.

Pheiffer & Smith, Milwaukee, are soon to erect a new factory 50 x 150 feet for the manufacture of special tools and machinery.

The Corbin Screw Corporation, New Britain, Conn., is to construct a new factory building 45 x 600 feet and seven stories in height with a power plant adjacent.

The Hyrum A. Silver Foundry & Machine Co., Salt Lake City, Utah, has filed articles of incorporation with a capitalization of $150,000. Joseph J. Daynes Jr., is president, and H. A. Silver, vice president and manager. A site has been acquired on which five brick buildings will be erected.

The International Heater Co., Utica, N. Y., has awarded contracts for the erection of a brick building 77 x 257 feet, two stories in height. This will join the warehouse and will give the company a continuous building about 800 feet in length. The new structure will be used as an assembling room and for the storage of castings.

The Bellaire Stove Co., Bellaire, O., is shortly to erect a foundry 80 x 100 feet.

The Waterman Car Wheel & Foundry Co., Houston, Tex., has practically completed its new plant which will be put in operation within a month. W. H. Waterman is vice president and general manager.

The Challingsworth Foundry & Machine Co., Mt. Vernon, O., has completed its foundry and installed electric cranes with complete equipment. The plant is in charge of H. C. Challingsworth, who, for the past six years, has been in charge of the foundry of C. & G. Cooper Co., engine builders of Mt. Vernon.

The Atlanta Steel Hoop Co., Atlanta, Ga., has completed extensive improvements at its plant, including a new rod mill with complete equipment, a wire drawing and nail plant, two 35-ton open-hearth furnaces, a reversible mill, gas producer power plant and other machinery. The blooming mill and steel plant will start about June 1, but other departments of the plant are now in operation.

The foundry which the Deere & Mansur Co., Moline, Ill., is soon to erect will be 80 x 182 feet in addition to an extension of the present foundry. Track and cars for charging the cupolas will be purchased. The company is also planning to increase its present blacksmith shop, punch room and steel storage shop. G. W. Crampton is secretary.

William Andrews, secretary of the Newport Rolling Mill Co., has purchased 20 acres of land in Newport, Ky., on which, it is stated, a large mill will be erected for the manufacture of steel ingots, billets, blooms and bars.

The Union Machinery & Supply Co., Seattle, Wash., is about to erect a new pattern house and blacksmith shop. Lathes, drill presses and other equipment will be installed. The company reports an unprecedented demand for saw mill machinery and for its line of shingle machines.

Plans have been completed for additions to the plant of the Union Malleable Iron Co., Moline, Ill. These will include an extension to the foundry and annealing department and the installation of new engines and dynamos.

The Lancaster Machine & Structural Works, with a capital of $350,000, is to take over the structural iron works of Anne & Thomas and the Thomas A. Anderson Engine & Machine Works, Lancaster, Pa. A site has been optioned in North Lancaster, where an extensive plant may be erected.

A. M. Blodgett, Cambridge City, Mo., has the contract for re-erecting the steel superstructure of the Vicksburg, Shreveport & Pacific railway bridge over the Ouachita river at Monroe, La. One span is 295 feet long, two are 243 feet long, and one is 120 feet long. The cost is estimated at $190,000.

The foundry which the Lattimer-Williams Mfg. Co., Columbus, O., expects to erect in the near future will be 110 x 300 feet. It will be electrically equipped.

The new buildings which the Haughton Elevator & Machine Co., Toledo, O., is to erect will be used for offices and drafting rooms and for the storage of patterns. The space at present occupied by offices, etc., will be converted into shop room. New tools will be installed and the company's capacity in manufacturing passenger and freight elevators will be materially enlarged.

General Industrial Notes:—

The Matteson Mfg. Co., Chicago, recently incorporated, will manufacture machinery and tools for the care of saws and machine knives, making a specialty of machines for the care of circular metal saws. The president, A. D. Matteson, was for 16 years superintendent for E. B. Rich & Son; James J. Chalmers, secretary, is a practical machinist and inventor, and A. T. Thomas is treasurer.

The L. P. & J. A. Smith Co., Cleveland, doing a dredging contracting business on the great lakes, is to be reorganized in order to care for increasing business. Control of the company will remain as at present.

The Elmore Furnace Co., Elmore, O., has sold its factory to the Universal Mfg. Co., a $200,000 concern, of which A. C. Eby, 719 Society for Savings, Cleveland is secretary and treasurer. The Nevin gas engine and compressed air transmission for traction wheels will be manufactured.

The Globe Iron Co., Jackson, O., has completed the relining of its furnace which will be put in blast within a few days.

The Kalisch Air Brake Co., St. Louis, Mo., recently incorporated, is manufacturing a patent air brake for automobiles.

C. G. Folsom Mfg. Co., South Bend, Ind., recently incorporated, succeeds to the business of C. G. Folsom. It makes a specialty of metal sheet iron work and manufactures the Folsom steel range, the Ideal rural mail box, automobile fenders, elevators, tanks, etc. E. L. Folsom is secretary.

The Sloss-Sheffield Steel & Iron Co., which has owned a two-third interest in the North Alabama Furnace Co., to which the Lady Ensley furnace at Sheffield belongs, recently bought the remaining third from E. A. Hopkins. The furnace has been out of blast for some months, but the plan is to blow it in during the summer.

The Racine Iron & Wire Works, Racine, Wis., which has been operated by Chas. Goehner for many years, has been sold to George Buck and John P. Hochguertel, foreman of the works for 25 years.

The Moran Co., Seattle, Wash., has been incorporated for $2,000,000 by the new interests which recently secured control of the ship building plant at that place. The trustees are: R. E. Griscom, Philadelphia; J. V. Paterson,

George H. Higbee, A. H. Soelberg, James T. Lawler, J. P. Fitzgerald and M. M. Lyter, of Seattle. Control of the plant will be transferred some time in April, but no large extensions will be made in the near future.

The plant of the Burton Car Works, Wichita, Kan., has been purchased from J. H. Bartlett by the American Warehouse Co. for $30,000. Three of the buildings will be used as warerooms, and the other two will be used for factory purposes.

The Cameron Machine Co., Brooklyn, N. Y., recently incorporated, succeeds to the business formerly conducted by James A. Cameron, consisting for the most part of the manufacture of special textile machines and cloth cutting machines. Considerable new tools and supplies will be purchased.

The Dallas Machinery Co., Dallas, Tex., has been absorbed by the Briggs-Weaver Co., of that city.

Walter McClure has been appointed temporary receiver for the International Concrete Steel Co., of Seattle, Wash.

The metal industries in Belgium are increasing in both production and prices, writes Consul-General Roosevelt from Brussels. Since Jan. 1 prices have advanced 13 to 26 per cent in certain products, with a scarcity of cast iron, blooms, and ingots. The output of cast iron in 1905 was 1,310,000 tons, about 28,000 tons more than the previous year, finished iron advancing by 20,000 tons. The output of rough steel increased by 90,000 tons, and in finished steel 122,000 tons.

Consul Culver, at London, Can., reports the invention of a ball-bearing adjustable axle nut by R. C. Williams of that city, which will prevent vehicle wheels from "backing off." The Adjustable Axle Nut Co., of London, Can., has been formed to manufacture these nuts, and will probably need a machine shop equipment.

All the nail factories of Mexico, with the exception of one at Monterey, are reported to have consolidated.

The National Machine Tool Builders' Association will hold its spring meeting for the year 1906, on May 1 and 2 in the Chalfont Hotel, Atlantic City, N. J.

Wire manufacturers of Belgium have entered into a syndicate agreement to control the markets of Belgium and Holland. Five leading manufacturers are in the association, and a fine of $10,000 is made for violation of any of its agreements.

Trade Notes:—

The Scherzer Rolling Lift Bridge Co., Chicago, reports a large number of orders recently placed by railroads for its lift bridges which are so constructed that any number of parallel tracks can be added from time to time to meet the requirements of extending traffic. Two bridges were recently installed by the New York, New Haven & Hartford at Westpoint, Conn., two are being constructed at Cos Cob, Conn., and two across the Housatonic river. A long span bridge is being built across the Connecticut river, and another was recently completed across the Neponset river. A six-track bridge has been constructed across the Bronx river, and another is planned across Eastchester bay. The Baltimore & Ohio is to duplicate the 160-foot span on the Newburg & South Shore railway, Cleveland, and is building one of 230-foot span near the mouth of the Cuyahoga river. A number of foreign orders have recently been completed, or are under construction.

The Otis Elevator Co. is to furnish two additional escalators for the Siegel-Cooper Co., New York. The first escalator was installed several years ago.

The Des Moines Bridge & Iron Works has been awarded the contract for the structural steel work on the R. A. Long office building, at Kansas City. The contract price is $126,000.

Recent sales at the Allis-Chalmers Co. include a 75-K. W. engine type generator to be used for lighting and power purposes at the Sharpsville, Pa. plant of the Youngstown Sheet & Tube Co., and 25 smooth chilled iron rolls, 12 x 30 inches for the National Perforating Machine Co., Kansas City, Mo.

Cowell & Colne, 11 Broadway, New York, agents for the Tropenas converter, have just closed a contract with the Malleable Iron Fittings Co., Bradford, Conn., for the installation of one of their two-ton converters for the manufacture of high pressure steam fittings.

John F. Allen, 372 Gerard avenue, New York, reports that Chris Cunningham, Greenpoint, Brooklyn, N. Y., and Geo. Fŏcht Sons, Hoboken, N. J., have recently installed two "Allen" boiler riveters, the former a 73-inch reach and the latter a 96-inch reach.

The Toledo Machine & Tool Co., Toledo, O., has received an order for a complete drop forging equipment which will contain over 15 carloads of machinery. Business in this line is reported exceedingly brisk.

The S. Obermayer Co., preparatory to remodeling its Cincinnati offices for extensive improvement and enlargement, has taken temporary quarters in the Union Trust Co. building.

TRADE PUBLICATIONS.

C. O. Bartlett & Snow, Cleveland, is distributing bulletin No. 17, describing rotary dryers. A short description of the machine is given, together with a list of users.

Dodge & Day, Nicetown, Philadelphia, are distributing pamphlet No. 14, describing the factory of the William Knabe Mfg. Co., Baltimore, which was entirely designed, erected and equipped under their direction.

The Star Corundum Wheel Co., Ltd., Detroit, has just published an illustrated catalog of emery and corundum wheels, grinding machinery and sharpening devices. The catalog contains over 100 pages, and illustrates and describes standard and special forms of wheels of all sizes; oil stones, grinding machinery and accessories.

The Gardner Machine Co., Spring & Varick streets, New York, has issued its 1906 catalog, describing a very complete line of milling machines, profiling machines, grinders, screw machines, turret lathes, etc., together with attachments for these tools. The catalog comprises over 200 pages, and is replete with information of value to machine tool users.

The Geo. V. Cresson Co., Philadelphia, has brought out a catalog entitled, "Rope Driving." This book brings forth the advantages of rope transmission in certain situations describing the various systems which are in use. Illustrations of the correct construction of pulleys, idlers, etc., are given, together with a number of tables containing useful information regarding this system of transmission.

The Brown & Sharpe Mfg. Co., Providence, R. I., has just brought out its 1906 catalog. This publication consists of 514 3¾ x 5¾ pages, and illustrates thoroughly the line of machine tools and small tools made by this company. It is gotten up in the usual style of Brown & Sharpe catalogs, and in addition to the description of tools contains a large amount of valuable information.

The Fox Machine Co., Grand Rapids, Mich., in catalog 29, describes a line of milling machines and sensitive drills. The milling machines comprise the No. 2 Fox hand miller with a range of 12 x 3½ x 5¾ inches; the No. 3 Fox hand power miller, with a range of 17¼ x 17½ x 5¾ inches, and a No. 3½ Fox hand power miller, with a range of 24 x 6 x 14¼ inches The drills described comprise a single spindle and multiple spindle machine.

The Robins Conveying Belt Co., New York, is distributing a number of single sheets, illustrating various applications of the Robins belt conveyor, to show that the conveyor used is a picking belt, and as a tailings stacker can be used for conveying coal in various situations. An illustration is also given of its use by contractors for first conveying excavating material out of the way, and later for bringing building material to the position where it is needed. An automatic self-reversing tripper and a Robins hoisting tower and bucket elevator are also illustrated.